CHAPTER A1 SEISMIC STRENGTHENING PROVISIONS FOR UNREINFORCED MASONRY BEARING WALL BUILDINGS

Section ID: text-id-27438855 | Section Number: 27438855

User Note: User note:About this appendix: Appendix A provides guidelines for upgrading the seismic-resi

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Section ID: text-id-27438855-0

About this appendix: Appendix A provides guidelines for upgrading the seismic-resistance capacity of different types of existing buildings. It is organized into separate chapters that deal with buildings of different types, including unreinforced masonry buildings, reinforced concrete and reinforced masonry wall buildings, and light-frame wood buildings.

Section ID: text-id-27438855-1

The purpose of this chapter is to promote public safety and welfare by reducing the risk of death or injury from the effects of earthquakes on existing unreinforced masonry bearing wall buildings.

Section ID: text-id-27438857-0

The provisions of this chapter are intended as minimum standards for structural seismic resistance, and are established primarily to reduce the risk of life loss or injury. Compliance with these provisions will not necessarily prevent loss of life or injury, or prevent earthquake damage to retrofitted buildings.

Section ID: text-id-27438857-1

The provisions of this chapter shall apply to all existing buildings not more than six stories in height above the base of the structure and having not fewer than one unreinforced masonry bearing wall. The elements regulated by this chapter shall be determined in accordance with Table A102.1. Except as provided herein, other structural provisions of the building code shall apply. This chapter does not apply to the alteration of existing electrical, plumbing, mechanical or fire safety systems.

Section ID: text-id-27438861-0

[BS] TABLE A102.1

Section ID: text-id-27438862-0

ELEMENTS REGULATED BY THIS CHAPTER

Section ID: text-id-27438862-1

a.Applies only to buildings designed according to the general procedures of Section A110.

Section ID: text-id-27438905-0

b.Applies only to buildings designed according to the special procedures of Section A111.

Section ID: text-id-27438905-1

The provisions of this chapter shall not apply to the strengthening of buildings in Risk Category III or IV. Such buildings shall be strengthened to meet the requirements of the International Building Code for new buildings of the same risk category or other such criteria approved by the code official.

Section ID: text-id-27438907-0

For the purpose of this chapter, the applicable definitions in the building code shall also apply.

Section ID: text-id-27438911-0

[BS] BED JOINT. The horizontal layer of mortar on which a masonry unit is laid.

Section ID: text-id-27438911-1

[BS] COLLAR JOINT. The vertical space between adjacent wythes. A collar joint may contain mortar or grout.

Section ID: text-id-27438911-2

[BS] CROSSWALL. A new or existing wall that meets the requirements of Section A111.3. A crosswall is not a shear wall.

Section ID: text-id-27438911-3

[BS] CROSSWALL SHEAR CAPACITY. The unit shear value times the length of the crosswall, $v_c L_c$.

Section ID: text-id-27438911-4

[BS] DETAILED BUILDING SYSTEM ELEMENTS. The localized elements and the interconnections of these elements that define the design of the building.

Section ID: text-id-27438911-5

[BS] DIAPHRAGM EDGE. The intersection of the horizontal diaphragm and a shear wall.

Section ID: text-id-27438911-6

[BS] DIAPHRAGM SHEAR CAPACITY. The unit shear value times the depth of the diaphragm, $v_u D$.

Section ID: text-id-27438911-7

[BS] FLEXIBLE DIAPHRAGM. A diaphragm of wood or untopped metal deck construction in which the horizontal deformation along its length is at least two times the average story drift.

Section ID: text-id-27438911-8

HEAD JOINT. The vertical mortar joint placed between masonry units within the wythe.

Section ID: text-id-27438911-9

[BS] NORMAL WALL. A wall perpendicular to the direction of seismic forces.

Section ID: text-id-27438911-10

[BS] OPEN FRONT. An exterior building wall line on one side only without vertical elements of the seismic force-resisting system in one or more stories.

Section ID: text-id-27438911-11

[BS] POINTING. The process of removal of deteriorated mortar from between masonry units and placement of new mortar. Also known as repointing or tuckpointing for purposes of this chapter.

Section ID: text-id-27438911-12

[BS] REPOINTING. See “Pointing.”

Section ID: text-id-27438911-13

[BS] RIGID DIAPHRAGM. A diaphragm of concrete construction or concrete-filled metal deck construction.

Section ID: text-id-27438911-14

[BS] TUCKPOINTING. See “Pointing.”

Section ID: text-id-27438911-15

[BS] UNREINFORCED MASONRY (URM). Includes burned clay, concrete or sand-lime brick; hollow clay or concrete block; plain concrete; and hollow clay tile. These materials shall comply with the requirements of Section A106 as applicable.

Section ID: text-id-27438911-16

[BS] UNREINFORCED MASONRY BEARING WALL. A URM wall that provides the vertical support for the reaction of floor or roof-framing members for which the total superimposed vertical load exceeds 100 pounds per linear foot (1459 N/m) of wall length.

Section ID: text-id-27438911-17

[BS] UNREINFORCED MASONRY WALL. A masonry wall that relies on the tensile strength of masonry units, mortar and grout in resisting design loads, and in which the area of reinforcement is less than the minimum amounts as defined for reinforced masonry walls.

Section ID: text-id-27438911-18

[BS] YIELD STORY DRIFT. The lateral displacement of one level relative to the level above or below at which yield stress is first developed in a frame member.

Section ID: text-id-27438911-19

For the purpose of this chapter, the following notations supplement the applicable symbols and notations in the building code.

Section ID: text-id-27438915-0

an = Diameter of core multiplied by its length or the area of the side of a square prism.

Section ID: text-id-27438915-1

A = Cross-sectional area of unreinforced masonry pier or wall, square inches (10-6 m2).

Section ID: text-id-27438915-2

Ab = Total area of the bed joints above and below the test specimen for each in-place shear test, square inches (10-6 m2).

Section ID: text-id-27438915-3

An = Area of net mortared or grouted section of a wall or wall pier.

Section ID: text-id-27438915-4

D = In-plane width dimension of pier, inches (10-3m), or depth of diaphragm, feet (m).

Section ID: text-id-27438915-5

DCR = Demand-capacity ratio specified in Section A111.4.2.

Section ID: text-id-27438915-6

f’m = Lower bound masonry compressive strength.

Section ID: text-id-27438915-7

fsp = Splitting tensile strength of masonry.

Section ID: text-id-27438915-8

Fwx = Force applied to a wall at level x, pounds (N).

Section ID: text-id-27438915-9

H = Least clear height of opening on either side of a pier, inches (10-3m).

Section ID: text-id-27438915-10

h/t = Height-to-thickness ratio of URM wall. Height, h, is measured between wall anchorage levels and/or slab-on-grade.

Section ID: text-id-27438915-11

L = Span of diaphragm between shear walls, or span between shear wall and open front, feet (m).

Section ID: text-id-27438915-12

Lc = Length of crosswall, feet (m).

Section ID: text-id-27438915-13

Li = Effective diaphragm span for an open-front building specified in Section A111.8, feet (m).

Section ID: text-id-27438915-14

P = Applied force as determined by standard test method of ASTM C496 or ASTM E519, pounds (N).

Section ID: text-id-27438915-15

PD = Superimposed dead load at the location under consideration, pounds (N). For determination of the rocking shear capacity, dead load at the top of the pier under consideration shall be used.

Section ID: text-id-27438915-16

PD+L = Stress resulting from the dead plus actual live load in place at the time of testing, pounds per square inch (kPa).

Section ID: text-id-27438915-17

Ptest = Splitting tensile test load determined by standard test method ASTM C496, pounds (N).

Section ID: text-id-27438915-18

Pw = Weight of wall, pounds (N).

Section ID: text-id-27438915-19

R = Response modification factor for Ordinary plain masonry shear walls in Bearing Wall System from Table 12.2-1 of ASCE 7, where R = 1.5.

Section ID: text-id-27438915-20

SDS = Design spectral acceleration at short period, in g units.

Section ID: text-id-27438915-21

SD1 = Design spectral acceleration at 1-second period, in g units.

Section ID: text-id-27438915-22

va = The shear strength of any URM pier, vmA/1.5 pounds (N).

Section ID: text-id-27438915-23

vc = Unit shear strength for a crosswall sheathed with any of the materials given in Table A108.1(1) or Table A108.1(2), pounds per foot (N/m).

Section ID: text-id-27438915-24

vmL = Shear strength of unreinforced masonry, pounds per square inch (kPa).

Section ID: text-id-27438915-25

Vaa = The shear strength of any URM pier or wall, pounds (N).

Section ID: text-id-27438915-26

Vca = Total shear capacity of crosswalls in the direction of analysis immediately above the diaphragm level being investigated, vcLc, pounds (N).

Section ID: text-id-27438915-27

Vcb = Total shear capacity of crosswalls in the direction of analysis immediately below the diaphragm level being investigated, vcLc, pounds (N).

Section ID: text-id-27438915-28

Vp = Shear force assigned to a pier on the basis of its relative shear rigidity, pounds (N).

Section ID: text-id-27438915-29

Vr = Pier rocking shear capacity of any URM wall or wall pier, pounds (N).

Section ID: text-id-27438915-30

vtest = Load at incipient cracking for each in-place shear test performed in accordance with Section A106.2.3.6, pounds (N).

Section ID: text-id-27438915-31

vtl = Lower bound mortar shear strength, pounds per square inch (kPa).

Section ID: text-id-27438915-32

vto = Mortar shear test values as specified in Section A106.2.3.6, pounds per square inch (kPa).

Section ID: text-id-27438915-33

vu = Unit shear capacity value for a diaphragm sheathed with any of the materials given in Table A108.1(1) or A108.1(2), pounds per foot (N/m).

Section ID: text-id-27438915-34

Vwx = Total shear force resisted by a shear wall at the level under consideration, pounds (N).

Section ID: text-id-27438915-35

W = Total seismic dead load as defined in the building code, pounds (N).

Section ID: text-id-27438915-36

Wd = Total dead load tributary to a diaphragm level, pounds (N).

Section ID: text-id-27438915-37

Ww = Total dead load of a URM wall above the level under consideration or above an open-front building, pounds (N).

Section ID: text-id-27438915-38

Wwx = Dead load of a URM wall assigned to level x halfway above and below the level under consideration, pounds (N).

Section ID: text-id-27438915-39

ΣvuD = Sum of diaphragm shear capacities of both ends of the diaphragm, pounds (N).

Section ID: text-id-27438915-40

ΣΣvuD = For diaphragms coupled with crosswalls, vuD includes the sum of shear capacities of both ends of diaphragms coupled at and above the level under consideration, pounds (N).

Section ID: text-id-27438915-41

ΣWd = Total dead load of all the diaphragms at and above the level under consideration, pounds (N).

Section ID: text-id-27438915-42

The seismic force-resisting system specified in this chapter shall comply with the International Building Code and referenced standards, except as modified herein.

Section ID: text-id-27438919-0

Alterations and repairs required to meet the provisions of this chapter shall comply with applicable structural requirements of the building code unless specifically provided for in this chapter.

Section ID: text-id-27438921-0

The following construction information shall be included in the plans required by this chapter:

Section ID: text-id-27438923-0

1. Dimensioned floor and roof plans showing existing walls and the size and spacing of floor and roof-framing members and sheathing materials. The plans shall indicate all existing URM walls, and new crosswalls and shear walls, and their materials of construction. The location of these walls and their openings shall be fully dimensioned and drawn to scale on the plans.

Section ID: text-id-27438923-1

2. Dimensioned URM wall elevations showing openings, piers, wall classes as defined in Section A106.2.3.9, thickness, heights, wall shear test locations, cracks or damaged portions requiring repairs, the general condition of the mortar joints, and if and where pointing is required. Where the exterior face is veneer, the type of veneer, its thickness and its bonding and/or ties to the structural wall masonry shall be noted.

Section ID: text-id-27438923-2

3. The type of interior wall and ceiling materials, and framing.

Section ID: text-id-27438923-3

4. The extent and type of existing wall anchorage to floors and roof where used in the design.

Section ID: text-id-27438923-4

5. The extent and type of parapet corrections that were previously performed, if any.

Section ID: text-id-27438923-5

6. Repair details, if any, of cracked or damaged unreinforced masonry walls required to resist forces specified in this chapter.

Section ID: text-id-27438923-6

7. All other plans, sections and details necessary to delineate required retrofit construction.

Section ID: text-id-27438923-7

8. The design procedure used shall be stated on both the plans and the permit application.

Section ID: text-id-27438923-8

9. Details of the anchor prequalification program required by Section A107.5.3, if used, including location and results of all tests.

Section ID: text-id-27438923-9

10. Quality assurance requirements of special inspection for all new construction materials and for retrofit construction including: anchor tests, pointing or repointing of mortar joints, installation of adhesive or mechanical anchors, and other elements as deemed necessary to ensure compliance with this chapter.

Section ID: text-id-27438923-10

Structural observation, in accordance with Section 1704.6 of the International Building Code, shall be required for all structures in which seismic retrofit is being performed in accordance with this chapter. Structural observation shall include visual observation of work for compliance with the approved construction documents and confirmation of existing conditions assumed during design.

Section ID: text-id-27438925-0

Structural testing and inspection for new and existing construction materials shall be in accordance with the building code, except as modified by this chapter.

Section ID: text-id-27438925-1

Special inspection as described in Section A105.3, Item 10, shall be provided equivalent to Level 3 as prescribed in TMS 402, Table 3.1(2).

Section ID: text-id-27438925-2

Existing materials used as part of the required vertical load-carrying or seismic force-resisting system shall be evaluated by on-site investigation and: determined to be in good condition (free of degraded mortar, degraded masonry units or significant cracking); or shall be repaired, enhanced, retrofitted or removed and replaced with new materials. Mortar joint deterioration shall be patched by pointing or repointing of the eroded joint in accordance with Section A106.2.3.10. Existing significant cracks in solid unit unreinforced and solid grouted hollow unit masonry shall be repaired.

Section ID: text-id-27438929-0

Unreinforced masonry walls used to support vertical loads or seismic forces parallel and perpendicular to the wall plane shall be tested as specified in this section. Masonry that does not meet the minimum requirements established by this chapter shall be repaired, enhanced, removed and replaced with new materials, or alternatively, shall have its structural functions replaced with new materials and shall be anchored to supporting elements.

Section ID: text-id-27438932-0

Unreinforced masonry walls shall be laid in a running bond pattern.

Section ID: text-id-27438934-0

The facing and backing wythes of multiplewythe walls shall be bonded so that not less than 10 percent of the exposed face area is composed of solid headers extending not less than 4 inches (102 mm) into the backing wythes. The clear distance between adjacent header courses shall not exceed 24 inches (610 mm) vertically or horizontally. Where backing consists of two or more wythes, the headers shall extend not less than 4 inches (102 mm) into the most distant wythe, or the backing wythes shall be bonded together with separate headers for which the area and spacing conform to the foregoing. Wythes of walls not meeting these requirements shall be considered to be veneer, and shall not be included in the effective thickness used in calculating the height-to-thickness ratio and the shear capacity strength of the wall.

Section ID: text-id-27438935-0

Exception: Where SD1 is 0.3 g or less, veneer wythes anchored and made composite with backup masonry are permitted to be used for calculation of the effective thickness.

Section ID: text-id-27438935-1

Lay-up patterns other than those specified in Section A106.2.2.1 are allowed if their performance can be justified.

Section ID: text-id-27438937-0

Grouted or ungrouted hollow concrete masonry units shall be tested in accordance with ASTM C140. Grouted or ungrouted structural clay load-bearing tile shall be tested in accordance with ASTM C67.

Section ID: text-id-27438941-0

Mortar joint shear test values, vto, shall be obtained by one of the following:

Section ID: text-id-27438943-0

1. ASTM C1531.

Section ID: text-id-27438943-1

2. For masonry walls that have high shear strength mortar, or where in-place testing is not practical because of crushing or other failure mode of the masonry, alternative procedures for testing shall be used in accordance with Section A106.2.3.2.

Section ID: text-id-27438943-2

The splitting tensile strength of existing masonry, fsp, or the prism strength of existing masonry, f′m, is permitted to be determined in accordance with ASTM C496 and calculated by the following equation:

Section ID: text-id-27438945-0

The shear tests shall be taken at locations representative of the mortar conditions throughout the building. Test locations shall be determined at the building site by the registered design professional in charge. Results of all tests and their locations shall be recorded.

Section ID: text-id-27438947-0

The minimum number of tests per masonry class shall be determined as follows:

Section ID: text-id-27438949-0

1. At each of both the first and top stories, not less than two tests per wall or line of wall elements providing a common line of resistance to seismic forces.

Section ID: text-id-27438949-1

2. At each of all other stories, not less than one test per wall or line of wall elements providing a common line of resistance to seismic forces.

Section ID: text-id-27438949-2

3. In any case, not less than one test per 1,500 square feet (139.4 m2) of wall surface and not less than a total of eight tests.

Section ID: text-id-27438949-3

1. Mortar shear test values, vto, in pounds per square inch (kPa), shall be obtained for each in-place shear test in accordance with the following equation:

Section ID: text-id-27438951-0

where:

Section ID: text-id-27438951-1

Vtest = Load at first observed movement.

Section ID: text-id-27438951-2

Ab = Total area of the bed joints above and below the test specimen.

Section ID: text-id-27438951-3

PD+L = Stress resulting from actual dead plus live loads in place at the time of testing.

Section ID: text-id-27438951-4

2. Individual unreinforced masonry walls with more than 50 percent of mortar test values, vto, less than 30 pounds per square inch (207 kPa) shall be pointed prior to and retested.

Section ID: text-id-27438951-5

3. The lower bound mortar shear strength, vtL, is defined as the mean minus one standard deviation of the mortar shear test values, vto.

Section ID: text-id-27438951-6

4. Unreinforced masonry with mortar shear strength, vtL, less than 30 pounds per square inch (207 kPa) shall be pointed and retested or shall have its structural function replaced, and shall be anchored to supporting elements in accordance with Sections A106.2.1 and A113.8. When existing mortar in any wythe is pointed to increase its shear strength and is retested, the condition of the mortar in the adjacent bed joints of the inner wythe or wythes and the opposite outer wythe shall be examined for extent of deterioration. The shear strength of any wall class shall be not

greater than that of the weakest wythe of that class.

Section ID: text-id-27438951-7

Where the alternative procedures of Section A106.2.3.2 are used to determine masonry quality, the following minimums apply:

Section ID: text-id-27438953-0

1. The minimum average value of splitting tensile strength, fsp, as calculated by Equation A1-1 shall be 50 pounds per square inch (344.7 kPa).

Section ID: text-id-27438953-1

2. Individual unreinforced masonry walls with average splitting tensile strength of less than 50 pounds per square inch (344.7 kPa) shall be pointed and retested.

Section ID: text-id-27438953-2

3. The lower-bound mortar strength fspL is defined as the mean minus one standard deviation PD+L of the splitting tensile test values fsp.

Section ID: text-id-27438953-3

The collar joints shall be inspected at the test locations during each in-place shear test, and estimates of the percentage of surfaces of the adjacent wythe that are covered with mortar shall be reported along with the results of the in-place shear tests.

Section ID: text-id-27438955-0

Existing unreinforced masonry shall be categorized into one or more classes based on shear strength, quality of construction, state of repair, deterioration and weathering. A class shall be characterized by the masonry shear strength determined in accordance with Section A108.2. Classes are defined for whole walls, not for small areas of masonry within a wall. Discretion in the definition of classes of masonry is permitted to avoid unnecessary testing.

Section ID: text-id-27438957-0

Deteriorated mortar joints in unreinforced masonry walls shall be pointed in accordance with the following requirements:

Section ID: text-id-27438959-0

1. Joint preparation. Deteriorated mortar shall be cut out by means of a toothing chisel or nonimpact power tool until sound mortar is reached, to a depth not less than 3/4 inch (19.1 mm) or twice the thickness of the joint, whichever is less, but not greater than 2 inches (50 mm). Care shall be taken not to damage the masonry edges. After cutting is complete, all loose material shall be removed with a brush, or air or water stream.

Section ID: text-id-27438959-1

2. Mortar preparation. The mortar mix shall be proportioned as required by the construction specifications and manufacturer’s approved instructions.

Section ID: text-id-27438959-2

3. Packing. The joint into which the mortar is to be packed shall be dampened but without free-standing water. The mortar shall be tightly packed into the joint in layers not exceeding 1/4 inch (6.4 mm) deep until it is filled; then it shall be tooled to a smooth surface to match the original profile.

Section ID: text-id-27438959-3

Nothing shall prevent pointing of any masonry wall joints before testing is performed in accordance with Section A106.2.3, except as required in Section A107.2.

Section ID: text-id-27438959-4

Preparation and mortar pointing shall be performed with special inspection.

Section ID: text-id-27438965-0

Exception: At the discretion of the code official, incidental pointing may be performed without special inspection.

Section ID: text-id-27438965-1

In-place masonry shear tests shall comply with Section A106.2.3.1. Testing of masonry for determination of splitting tensile strength shall comply with Section A106.2.3.3.

Section ID: text-id-27438967-0

Existing wall anchors used as all or part of the required tension anchors shall be tested in pullout according to Section A107.5.1. Not fewer than four anchors tested per floor shall be tested in pullout, with not fewer than two tests at walls with joists framing into the wall and two tests at walls with joists parallel to the wall, but not less than 10 percent of the total number of existing tension anchors at each level.

Section ID: text-id-27438969-0

New wall anchors embedded in URM walls shall be subject to special inspection prior to placement of the anchor and grout or adhesive in the drilled hole. Five percent of all anchors that do not extend through the wall shall be subject to a direct-tension test, and an additional 20 percent shall be tested using a calibrated torque wrench. Testing shall be performed in accordance with Section A107.5.

Section ID: text-id-27438971-0

New wall anchors embedded in URM walls resisting tension forces or a combination of tension and shear forces shall be subject to special inspection, prior to placement of the anchor and grout or adhesive in the drilled hole. Five percent of all anchors resisting tension forces shall be subject to a direct-tension test, and an additional 20 percent shall be tested using a calibrated torque wrench. Testing shall be performed in accordance with Section A107.5.

Section ID: text-id-27438971-1

Exception: New bolts that extend through the wall with steel plates on the far side of the wall need not be tested.

Section ID: text-id-27438971-2

Tests of anchors in unreinforced masonry walls shall be in accordance with Sections A107.5.1 through A107.5.3. Results of all tests shall be reported to the authority having jurisdiction. The report shall include the test results of maximum load for each test; pass-fail results; corresponding anchor size and type; orientation of loading; details of the anchor installation, testing apparatus and embedment; wall thickness; and joist orientation and proximity to the tested anchor.

Section ID: text-id-27438973-0

The test apparatus shall be supported by the masonry wall. The test procedure for prequalification of tension and shear anchors shall comply with ASTM E488. Existing wall anchors shall be given a preload of 300 pounds (1335 N) before establishing a datum for recording elongation. The tension test load reported shall be recorded at 1/8 inch (3.2 mm) relative movement between the existing anchor and the adjacent masonry surface. New embedded tension anchors shall be subject to a direct tension load of not less than 2.5 times the design load but not less than 1,500 pounds (6672 N) for 5 minutes.

Section ID: text-id-27438974-0

Exception: Where obstructions occur, the distance between the anchor and the test apparatus support shall be not less than one-half the wall thickness for existing anchors and 75 percent of the embedment length for new embedded anchors.

Section ID: text-id-27438974-1

Anchors embedded in unreinforced masonry walls shall be tested using a torque-calibrated wrench to the following minimum torques:

Section ID: text-id-27438976-0

•1/2-inch-diameter (12.7 mm) bolts: 40 foot pounds (54.2 N-m).

Section ID: text-id-27438976-1

•5/8-inch-diameter (15.9 mm) bolts: 50 foot pounds (67.8 N-m).

Section ID: text-id-27438976-2

•3/4-inch-diameter (19.1 mm) bolts: 60 foot pounds (81.3 N-m).

Section ID: text-id-27438976-3

ASTM E488 or the test procedure in Section A107.5.1 is permitted to be used to determine tension or shear strength values for anchors greater than those permitted by Table A108.1(2). Anchors shall be installed in the same manner and using the same materials as will be used in the actual construction. Not fewer than five tests for each bolt size and type shall be performed for each class of masonry in which they are proposed to be used. The tension and shear strength values for such anchors shall be the lesser of the average ultimate load divided by 5.0 or the average load at which 1/8 inch (3.2 mm) elongation occurs for each size and type of anchor and class of masonry.

Section ID: text-id-27438978-0

1. Strength values for existing materials are given in Table A108.1(1) and for new materials in Table A108.1(2).

Section ID: text-id-27438983-0

2. The strength reduction factor, φ, shall be taken equal to 1.0.

Section ID: text-id-27438983-1

3. The use of materials not specified herein shall be based on substantiating research data or engineering judgment, as approved by the code official.

Section ID: text-id-27438983-2

[BS] TABLE A108.1(1)

Section ID: text-id-27438984-0

STRENGTH VALUES FOR EXISTING MATERIALS

Section ID: text-id-27438984-1

For SI: 1 inch = 25.4 mm, 1 square inch = 645.16 mm2, 1 pound = 4.4 N, 1 pound per square inch = 6894.75 N/m2, 1 pound per foot = 14.43 N/m.

Section ID: text-id-27439022-0

a.Material must be sound and in good condition.

Section ID: text-id-27439022-1

b.Shear values of these materials may be combined, except the total combined value should not exceed 900 pounds per foot.

Section ID: text-id-27439022-2

c.Minimum 22-gage steel deck with welds to supports satisfying the standards of the Steel Deck Institute.

Section ID: text-id-27439022-3

d.Minimum 22-gage steel deck with 3/4-inch diameter plug welds at an average spacing not exceeding 8 inches and with sidelap welds appropriate for the deck span.

Section ID: text-id-27439022-4

[BS] TABLE A108.1(2)

Section ID: text-id-27439023-0

STRENGTH VALUES OF NEW MATERIALS USED IN CONJUNCTION WITH EXISTING CONSTRUCTION

Section ID: text-id-27439023-1

For SI: 1 inch = 25.4 mm, 1 square inch = 645.16 mm2, 1 pound = 4.4 N, 1 degree = 0.017 rad, 1 pound per foot = 14.43 N/m, 1 foot = 304.8 mm.

Section ID: text-id-27439057-0

a. Embedded anchors to be tested as specified in Section A107.4.

Section ID: text-id-27439057-1

b. Anchors shall be 1/2 inch minimum in diameter.

Section ID: text-id-27439057-2

c. Drilling for anchors shall be done with an electric rotary drill; impact tools should not be used for drilling holes or tightening anchors and shear bolt nuts.

Section ID: text-id-27439057-3

d. Load factors or capacity reduction factors shall not be used.

Section ID: text-id-27439057-4

e. Other bolt sizes, values and installation methods may be used, provided that a testing program is conducted in accordance with Section A107.5.3. The strength value shall be determined by multiplying the calculated allowable value, determined in accordance with Section A107.5.3, by 3.0, and the usable value shall be limited to not greater than 1.5 times the value given in the table.

Bolt spacing shall not exceed 6 feet on center and shall be not less than 12 inches on center.

Section ID: text-id-27439057-5

f.An alternative adhesive anchor bolt system is permitted to be used providing: its properties and installation conform to an ICC Evaluation Service Report; and the report states that the system's use is in unreinforced masonry as an acceptable alternative to Sections A107.4 and A113.1 or TMS 402, Section 2.1.4. The report's allowable values shall be multiplied by a factor of three to obtain strength values and the strength reduction factor, φ, shall be taken equal to 1.0.

Section ID: text-id-27439057-6

The unreinforced masonry shear strength, vmL, shall be determined for each masonry class from one of the following equations:

Section ID: text-id-27439059-0

1. When testing is performed in accordance with Section A106.2.3.1, the unreinforced masonry shear strength, vm, shall be determined by Equation A1-3.

Section ID: text-id-27439059-1

The mortar shear strength values, vtL, shall be determined in accordance with Section A106.2.3.6.

Section ID: text-id-27439059-2

2. When alternate testing is performed in accordance with Section A106.2.3.3, unreinforced masonry shear, vmL, shall be determined by Equation A1-4.

Section ID: text-id-27439059-3

Where any increase in wall dead plus live load compression stress occurs, the maximum compression stress in unreinforced masonry, QG/An, shall not exceed 300 pounds per square inch (2070 kPa).

Section ID: text-id-27439061-0

Unreinforced masonry shall be assumed to have no tensile capacity.

Section ID: text-id-27439063-0

The tension strength of wall anchors shall be the average of the tension test values for anchors having the same wall thickness and framing orientation.

Section ID: text-id-27439065-0

For existing foundations, new total dead loads are permitted to be increased over the existing dead load by 25 percent. New total dead load plus live load plus seismic forces may be increased over the existing dead load plus live load by 50 percent. Higher values may be justified only in conjunction with a geotechnical investigation.

Section ID: text-id-27439067-0

The elements of buildings hereby required to be analyzed are specified in Table A102.1.

Section ID: text-id-27439071-0

Buildings with rigid diaphragms shall be analyzed by the general procedure of Section A110. Buildings with flexible diaphragms shall be analyzed by the general procedure or, where applicable, are permitted to be analyzed by the special procedure of Section A111.

Section ID: text-id-27439073-0

Buildings shall be analyzed to resist minimum lateral forces assumed to act nonconcurrently in the direction of each of the main axes of the structure in accordance with the following:

Section ID: text-id-27439077-0

[BS] TABLE A110.2

Section ID: text-id-27439078-0

ALLOWABLE VALUE OF HEIGHT-TO-THICKNESS RATIO OF UNREINFORCED MASONRY WALLS

Section ID: text-id-27439078-1

For SI:1 pound per square inch = 6894.75 N/m2.

Section ID: text-id-27439105-0

a. Applies to the special procedures of Section A111 only. See Section A111.7 for other restrictions.

Section ID: text-id-27439105-1

b. This value of height-to-thickness ratio shall be used where mortar shear tests establish a tested mortar shear strength, vt, of not less than 100 pounds per square inch. This value shall also be used where the tested mortar shear strength is not less than 60 pounds per square inch, and where a visual examination of the collar joint indicates not less than 50-percent mortar coverage.

Section ID: text-id-27439105-2

c. Where a visual examination of the collar joint indicates not less than 50-percent mortar coverage, and the tested mortar shear strength, vt, is greater than 30 pounds per square inch but less than 60 pounds per square inch, the allowable height-to-thickness ratio may be determined by linear interpolation between the larger and smaller ratios in direct proportion to the tested mortar shear strength.

Section ID: text-id-27439105-3

Parts and portions of a structure not covered in Section A110.3 shall be analyzed and designed per the current building code, using force levels defined in Section A110.1.

Section ID: text-id-27439107-0

Exceptions:

Section ID: text-id-27439107-1

1. Unreinforced masonry walls for which height-tothickness ratios do not exceed ratios set forth in Table A110.2 need not be analyzed for out-of-plane loading. Unreinforced masonry walls that exceed the allowable h/t ratios of Table A110.2 shall be braced according to Section A113.5.

Section ID: text-id-27439107-2

2. Parapets complying with Section A113.6 need not be analyzed for out-of-plane loading.

Section ID: text-id-27439107-3

3. Where walls are to be anchored to flexible floor and roof diaphragms, the anchorage shall be in accordance with Section A113.1.

Section ID: text-id-27439107-4

Vertical seismic force-resisting elements shall be analyzed in accordance with Section A112.

Section ID: text-id-27439109-0

Any redundancy or overstrength factors contained in the building code may be taken as unity. The vertical component of seismic force (Ev) may be taken as zero.

Section ID: text-id-27439111-0

The special procedures of this section shall be applied only to buildings having the following characteristics:

Section ID: text-id-27439115-0

1. Flexible diaphragms at all levels above the base of the structure.

Section ID: text-id-27439115-1

2. Vertical elements of the seismic force-resisting system consisting predominantly of masonry or a combination of masonry and concrete shear walls.

Section ID: text-id-27439115-2

3. Except for single-story buildings with an open front on one side only, not fewer than two lines of vertical elements of the seismic force-resisting system parallel to each axis of the building (see Section A111.8 for open front buildings).

Section ID: text-id-27439115-3

With the exception of the provisions in Sections A111.4 through A111.7, elements of structures shall comply with Sections A110.2 through A110.4.

Section ID: text-id-27439117-0

Crosswalls shall meet the requirements of this section.

Section ID: text-id-27439119-0

A crosswall is a wood-framed wall sheathed with any of the materials described in Table A108.1(1) or Table A108.1(2) or other system as defined in Section A111.3.5. Crosswalls shall be spaced not more than 40 feet (12 192 mm) on center measured perpendicular to the direction of consideration, and shall be placed in each story of the building. Crosswalls shall extend the full story height between diaphragms.

Section ID: text-id-27439120-0

Exceptions:

Section ID: text-id-27439120-1

1. Crosswalls need not be provided at all levels where used in accordance with Section A111.4.2, Item 4.

Section ID: text-id-27439120-2

2. Existing crosswalls need not be continuous below a wood diaphragm at or within 4 feet (1219 mm) of grade, provided that:

Section ID: text-id-27439120-3

2.1. Shear connections and anchorage requirements of Section A111.5 are satisfied at all edges of the diaphragm.

Section ID: text-id-27439120-4

2.2. Crosswalls with total shear capacity of 0.5SD1ΣWd interconnect the diaphragm to the foundation.

Section ID: text-id-27439120-5

2.3. The demand-capacity ratio of the diaphragm between the crosswalls that are continuous to their foundations does not exceed 2.5, calculated as follows:

Section ID: text-id-27439120-6

Within any 40 feet (12 192 mm) measured along the span of the diaphragm, the sum of the crosswall shear capacities shall be not less than 30 percent of the diaphragm shear capacity of the strongest diaphragm at or above the level under consideration.

Section ID: text-id-27439122-0

Existing crosswalls shall have a maximum height-to-length ratio between openings of 1.5 to 1. Existing crosswall connections to diaphragms need not be investigated as long as the cross-wall extends to the framing of the diaphragms above and below.

Section ID: text-id-27439124-0

New crosswall connections to the diaphragm shall develop the crosswall shear capacity. New crosswalls shall have the capacity to resist an overturning moment equal to the crosswall shear capacity times the story height. Crosswall overturning moments need not be cumulative over more than two stories.

Section ID: text-id-27439126-0

Other systems, such as moment-resisting frames, may be used as cross-walls provided that the yield story drift does not exceed 1 inch (25 mm) in any story.

Section ID: text-id-27439128-0

A diaphragm is acceptable if the point (L,DCR) on Figure A111.4.1 falls within Region 1, 2 or 3.

Section ID: text-id-27439132-0

[BS] FIGURE A111.4.1

Section ID: text-id-27439135-0

ACCEPTABLE DIAPHRAGM SPAN

Section ID: text-id-27439135-1

Demand-capacity ratios shall be calculated for the diaphragm at any level according to the following formulas:

Section ID: text-id-27439137-0

1. For a diaphragm without qualifying crosswalls at levels immediately above or below:

Section ID: text-id-27439137-1

2. For a diaphragm in a single-story building with qualifying crosswalls, or for a roof diaphragm coupled by crosswalls to the diaphragm directly below:

Section ID: text-id-27439137-2

3. For diaphragms in a multiple-story building with qualifying crosswalls in all levels:

Section ID: text-id-27439137-3

DCR shall be calculated at each level for the set of diaphragms at and above the level under consideration. In addition, the roof diaphragm shall meet the requirements of Equation A1-10.

Section ID: text-id-27439137-4

4. For a roof diaphragm and the diaphragm directly below, if coupled by crosswalls:

Section ID: text-id-27439137-5

An analysis for diaphragm flexure need not be made, and chords need not be provided.

Section ID: text-id-27439139-0

An analysis of diaphragm collector forces shall be made for the transfer of diaphragm edge shears into vertical elements of the lateral force-resisting system. Collector forces may be resisted by new or existing elements.

Section ID: text-id-27439141-0

1. Diaphragm forces at corners of openings shall be investigated and shall be developed into the diaphragm by new or existing materials.

Section ID: text-id-27439143-0

2. In addition to the demand-capacity ratios of Section A111.4.2, the demand-capacity ratio of the portion of the diaphragm adjacent to an opening shall be calculated using the opening dimension as the span.

Section ID: text-id-27439143-1

3. Where an opening occurs in the end quarter of the diaphragm span, the calculation of vuD for the demand-capacity ratio shall be based on the net depth of the diaphragm.

Section ID: text-id-27439143-2

Diaphragms shall be connected to shear walls and new vertical seismic forceresisting elements with connections capable of developing the diaphragm-loading tributary to the shear wall or new seismic force-resisting elements given by the lesser of the following formulas:

Section ID: text-id-27439146-0

using the Cp values in Table A111.5, or

Section ID: text-id-27439146-1

[BS] TABLE A111.5

Section ID: text-id-27439147-0

HORIZONTAL FORCE FACTOR, Cp

Section ID: text-id-27439147-1

The wall story force distributed to a shear wall at any diaphragm level shall be the lesser value calculated as:

Section ID: text-id-27439164-0

but need not exceed

Section ID: text-id-27439164-1

The wall story shear shall be the sum of the wall story forces at and above the level of consideration.

Section ID: text-id-27439166-0

Shear walls shall comply with Section A112.

Section ID: text-id-27439168-0

New seismic force-resisting elements such as moment frames, braced frames or shear walls shall be designed as required by the building code, except that the seismic forces shall be as specified in Section A111.6.1, and the story drift ratio shall be limited to 0.015, except as further limited by Section A112.4.2 for moment frames.

Section ID: text-id-27439170-0

The provisions of Section A110.2 are applicable, except the allowable height-to-thickness ratios given in Table A110.2 shall be determined from Figure A111.4.1 as follows:

Section ID: text-id-27439174-0

1. In Region 1, height-to-thickness ratios for buildings with crosswalls may be used if qualifying cross-walls are present in all stories.

Section ID: text-id-27439174-1

2. In Region 2, height-to-thickness ratios for buildings with crosswalls may be used whether or not qualifying crosswalls are present.

Section ID: text-id-27439174-2

3. In Region 3, height-to-thickness ratios for “all other buildings” shall be used whether or not qualifying crosswalls are present.

Section ID: text-id-27439174-3

Where diaphragms above and below the wall under consideration have demand-capacity ratios in different regions of Figure A111.4.1, the lesser height-to-thickness ratio shall be used.

Section ID: text-id-27439176-0

A single-story building with an open front on one side and crosswalls parallel to the open front may be designed by the following procedure:

Section ID: text-id-27439179-0

1. Effective diaphragm span, Li, for use in Figure A111.4.1 shall be determined in accordance with the following formula:

Section ID: text-id-27439179-1

2. Diaphragm demand-capacity ratio shall be calculated as:

Section ID: text-id-27439179-2

The following requirements are applicable to both the general procedure and the special procedure for analyzing vertical elements of the lateral force-resisting system.

Section ID: text-id-27439183-0

Flexural components of deflection need not be considered in determining the rigidity of an unreinforced masonry wall.

Section ID: text-id-27439186-0

Wall piers shall be analyzed according to the following procedure, which is diagrammed in Figure A112.2.2.

Section ID: text-id-27439188-0

1.For any pier,

Section ID: text-id-27439188-1

1.1.The pier shear capacity shall be calculated as:

Section ID: text-id-27439188-2

where:

Section ID: text-id-27439188-3

An = area of net mortared or grouted section of a wall or wall pier.

Section ID: text-id-27439188-4

1.2.The pier rocking shear capacity shall be calculated as:

Section ID: text-id-27439188-5

2.The wall piers at any level are acceptable if they comply with one of the following modes of behavior:

Section ID: text-id-27439188-6

2.1.Rocking controlled mode. Where the pier rocking shear capacity is less than the pier shear capacity, in other words, Vr < va, for each pier in a level, forces in the wall at that level, Vwx, shall be distributed to each pier in proportion to PDD/H.

Section ID: text-id-27439188-7

For the wall at that level:

Section ID: text-id-27439188-8

2.2.Shear controlled mode. Where the pier shear capacity is less than the pier rocking capacity, in other words, va < Vr in one or more pier(s) in a level, forces in the wall at the level, Vwx, shall be distributed to each pier in proportion to D/H.

Section ID: text-id-27439188-9

For each pier at that level:

Section ID: text-id-27439188-10

If Vp < va for each pier and Vp > Vr for one or more piers, such piers shall be omitted from the analysis, and the procedure shall be repeated for the remaining piers, unless the wall is strengthened and reanalyzed.

Section ID: text-id-27439188-12

3.Masonry pier tension stress. Unreinforced masonry wall piers need not be analyzed for tension stress.

Section ID: text-id-27439188-13

[BS] FIGURE A112.2.2

Section ID: text-id-27439191-0

ANALYSIS OF URM WALL IN-PLANE SHEAR FORCES

Section ID: text-id-27439191-1

Shear walls without openings shall be analyzed the same as for walls with openings, except that Vr shall be calculated as follows:

Section ID: text-id-27439193-0

Plywood-sheathed shear walls may be used to resist lateral forces for URM buildings with flexible diaphragms analyzed according to provisions of Section A111. Plywood-sheathed shear walls shall not be used to share lateral forces with other materials along the same line of resistance.

Section ID: text-id-27439196-0

Seismic forces shall be distributed among the vertical-resisting elements in proportion to their relative rigidities, except that moment-resisting frames shall comply with Section A112.4.2.

Section ID: text-id-27439199-0

Moment resisting frames shall not be used with an unreinforced masonry wall in a single line of resistance unless the wall has piers that have adequate shear capacity to sustain rocking in accordance with Section A112.2.2. The frames shall be designed in accordance with the building code to resist 100 percent of the seismic forces tributary to that line of resistance, as determined from Section A111.2. The story drift ratio shall be limited to 0.0075.

Section ID: text-id-27439201-0

Unreinforced masonry walls shall be anchored at the roof and floor levels as required in Section A110.2. Ceilings of plaster or similar materials, where not attached directly to roof or floor framing and where abutting masonry walls, shall either be anchored to the walls at a maximum spacing of 6 feet (1829 mm) or be removed.

Section ID: text-id-27439207-0

Anchors shall consist of bolts installed through the wall as specified in Table A108.1(2), or an approved equivalent at a maximum anchor spacing of 6 feet (1829 mm). Wall anchors shall be secured to the framing members parallel or perpendicular to the wall to develop the required forces.

Section ID: text-id-27439209-0

Anchorage of masonry walls to each floor or roof shall resist a minimum force determined as 0.9SDS times the tributary weight or 200 pounds per linear foot (2920 N/m), whichever is greater, acting normal to the wall at the level of the floor or roof. Existing wall anchors, if used, must be tested and meet the requirements of Section A107.5.1 or be upgraded.

Section ID: text-id-27439211-0

At the roof and floor levels, both shear and tension anchors shall be provided within 2 feet (610 mm) horizontally from the inside of the corners of the walls.

Section ID: text-id-27439213-0

Anchors transmitting shear forces shall have a maximum spacing of 6 feet (1829 mm) and shall have nuts installed over malleable iron or plate washers where bearing on wood, and heavy-cut washers where bearing on steel.

Section ID: text-id-27439216-0

Collector elements shall be provided that are capable of transferring the seismic forces originating in other portions of the building to the element providing the resistance to those forces.

Section ID: text-id-27439218-0

Ties and continuity shall conform to the requirements of the building code.

Section ID: text-id-27439220-0

Where a wall height-to-thickness ratio exceeds the specified limits, the wall may be laterally supported by vertical bracing members per Section A113.5.2 or by reducing the wall height by bracing per Section A113.5.3.

Section ID: text-id-27439223-0

Vertical bracing members shall be attached to floor and roof construction for their design loads independently of required wall anchors. Horizontal spacing of vertical bracing members shall not exceed one-half of the unsupported height of the wall or 10 feet (3048 mm). Deflection of such bracing members at design loads shall not exceed one-tenth of the wall thickness.

Section ID: text-id-27439225-0

The wall height may be reduced by bracing elements connected to the floor or roof. Horizontal spacing of the bracing elements and wall anchors shall be as required by design, but shall not exceed 6 feet (1829 mm) on center. Bracing elements shall be detailed to minimize the horizontal displacement of the wall by the vertical displacement of the floor or roof.

Section ID: text-id-27439227-0

Parapets and exterior wall appendages not conforming to this chapter shall be removed, or stabilized or braced to ensure that the parapets and appendages remain in their original positions.

Section ID: text-id-27439230-0

The maximum height of an unbraced unreinforced masonry parapet above the lower of either the level of tension anchors or the roof sheathing shall not exceed the height-to-thickness ratio shown in Table A113.6. If the required parapet height exceeds this maximum height, a bracing system designed for the forces determined in accordance with the building code shall support the top of the parapet. Parapet corrective work must be performed in conjunction with the installation of tension roof anchors.

Section ID: text-id-27439230-1

The height of a URM parapet above any wall anchor shall be not less than 12 inches (305 mm).

Section ID: text-id-27439230-2

Exception: If a reinforced concrete beam is provided at the top of the wall, the height above the wall anchor is permitted to be not less than 6 inches (152 mm).

Section ID: text-id-27439230-3

[BS] TABLE A113.6

Section ID: text-id-27439231-0

MAXIMUM ALLOWABLE HEIGHT-TO-THICKNESS RATIO FOR PARAPETS

Section ID: text-id-27439231-1

1. Veneer shall be anchored with approved anchor ties conforming to the required design capacity specified in the building code and shall be placed at a maximum spacing of 24 inches (610 mm) with a maximum supported area of 4 square feet (0.372 m2).

Section ID: text-id-27439244-0

Exception: Existing anchor ties for attaching brick veneer to brick backing shall be acceptable, provided that the ties are in good condition and conform to the following minimum size and material requirements.

Section ID: text-id-27439244-1

Existing veneer anchor ties shall be considered adequate if they are of corrugated galvanized iron strips not less than 1 inch (25 mm) in width, 8 inches (203 mm) in length and 1/16 inch (1.6 mm) in thickness, or the equivalent.

Section ID: text-id-27439244-2

2. The location and condition of existing veneer anchor ties shall be verified as follows:

Section ID: text-id-27439244-3

2.1. An approved testing laboratory shall verify the location and spacing of the ties and shall submit a report to the code official for approval as part of the structural analysis.

Section ID: text-id-27439244-4

2.2. The veneer in a selected area shall be removed to expose a representative sample of ties (not less than four) for inspection by the code official.

Section ID: text-id-27439244-5

Unreinforced masonry walls that do not carry design vertical or lateral loads and that are not required by the design to be part of the lateral force-resisting system shall be adequately anchored to new or existing supporting elements. The anchors and elements shall be designed for the out-of-plane forces specified in the building code. The height- or length-to-thickness ratio between such supporting elements for such walls shall not exceed nine.

Section ID: text-id-27439246-0

Where trusses and beams other than rafters or joists are supported on masonry, independent secondary columns shall be installed to support vertical loads of the roof or floor members.

Section ID: text-id-27439248-0

Exception: Secondary supports are not required where SD1 is less than 0.3 g.

Section ID: text-id-27439248-1

Where elements of adjacent buildings do not have a separation of 5 inches (127 mm) or greater, the allowable height-to-thickness ratios for “all other buildings” per Table A110.2 shall be used in the direction of consideration.

Section ID: text-id-27439250-0

Walls of unburned clay, adobe or stone masonry construction shall conform to the following:

Section ID: text-id-27439254-0

1. Walls of unburned clay, adobe or stone masonry shall not exceed a height- or length-to-thickness ratio specified in Table A114.1.

Section ID: text-id-27439254-1

2. Adobe shall be allowed a maximum value of 9 pounds per square inch (62.1 kPa) for shear unless higher values are justified by test.

Section ID: text-id-27439254-2

3. Mortar for repointing may be of the same soil composition and stabilization as the brick, in lieu of cement mortar.

Section ID: text-id-27439254-3

[BS] TABLE A114.1

Section ID: text-id-27439255-0

MAXIMUM HEIGHT-TO-THICKNESS RATIO FOR ADOBE OR STONE WALLS

Section ID: text-id-27439255-1

The purpose of this chapter is to promote public safety and welfare by reducing the risk of death or injury as a result of the effects of earthquakes on reinforced concrete and reinforced masonry wall buildings with flexible diaphragms. Based on past earthquakes, these buildings have been categorized as being potentially hazardous and prone to significant damage, including possible collapse in a moderate to major earthquake. The provisions of this chapter are minimum standards for structural seismic resistance established primarily to reduce the risk of life loss or injury on both subject and adjacent properties. These provisions will not necessarily prevent loss of life or injury, or prevent earthquake damage to an existing building that complies with these standards.

Section ID: text-id-27439284-0

The provisions of this chapter shall apply to wall anchorage systems that resist out-of-plane forces and to collectors in existing reinforced concrete or reinforced masonry buildings with flexible diaphragms. Wall anchorage systems that were designed and constructed in accordance with the 1997 Uniform Building Code or the 2000 or subsequent editions of the International Building Code shall be deemed to comply with these provisions.

Section ID: text-id-27439288-0

For the purpose of this chapter, the applicable definitions in the International Building Code and the following shall apply:

Section ID: text-id-27439292-0

[BS] CONTINUITY CONNECTOR. A component, typically a plate, rod, strap or hold-down, that ensures load path continuity along the full length of a crosstie or strut.

Section ID: text-id-27439292-1

[BS] CROSSTIE. A member or group of members continuous across the main diaphragm that connects opposite wall lines and transfers out-of-plane wall anchorage forces into the diaphragm.

Section ID: text-id-27439292-2

[BS] FLEXIBLE DIAPHRAGM. A roof or floor sheathed with plywood, wood decking (1-by or 2-by) or metal deck without a concrete topping slab.

Section ID: text-id-27439292-3

[BS] STRUT. A member or group of members continuous across a subdiaphragm that transfers out-of-plane wall anchorage forces into the subdiaphragm.

Section ID: text-id-27439292-4

[BS] WALL ANCHORAGE SYSTEM. The components comprising a complete load path for out-of-plane wall forces from the wall to the main diaphragm, typically including anchors embedded in or fastened to the wall; rods, straps, plates, hold-downs or other hardware; subdiaphragms and their chords; crossties; struts; and continuity connectors.

Section ID: text-id-27439292-5

[BS] WALL SEGMENT. Any length of concrete wall with continuous horizontal reinforcing and not interrupted or intersected by a pilaster or vertical construction joint, or any length of reinforced masonry wall with continuous horizontal reinforcing and not interrupted or intersected by a pilaster or vertical control joint.

Section ID: text-id-27439292-6

For the purpose of this chapter, the applicable symbols and notations in the International Building Code shall apply.

Section ID: text-id-27439296-0

The seismic-resisting elements specified in this chapter shall comply with applicable provisions of Section 1613 of the International Building Code and Chapter 12 of ASCE 7, except as modified herein.

Section ID: text-id-27439300-0

The plans shall accurately reflect the results of the engineering investigation and design and shall show all pertinent dimensions and sizes for plan review and construction. The following shall be provided:

Section ID: text-id-27439302-0

1.Floor plans and roof plans shall show existing framing construction, diaphragm construction, proposed wall anchors, crossties and collectors. Existing nailing, anchors, crossties and collectors shall be shown on the plans if they are considered part of the lateral force-resisting systems.

Section ID: text-id-27439302-1

2.Typical wall panel details and sections with panel thickness, height, pilasters and location of anchors shall be provided.

Section ID: text-id-27439302-2

3.Details shall include existing and new anchors and the method of developing anchor forces into the diaphragm framing, existing and new crossties, and existing and new or improved support of roof and floor girders at pilasters or walls.

Section ID: text-id-27439302-3

4.The basis for design and the building code used for the design shall be stated on the plans.

Section ID: text-id-27439302-4

Structural observation, in accordance with Section 1704.6 of the International Building Code is required, regardless of seismic design category, height or other conditions. Structural observation shall include visual observation of work for conformance to the approved construction documents and confirmation of existing conditions assumed during design.

Section ID: text-id-27439304-0

In addition to the requirements of Section 1705.13 of the International Building Code, special inspection shall be required for:

Section ID: text-id-27439305-0

1.Installation of anchors into existing concrete or masonry walls to form part of a wall anchorage system.

Section ID: text-id-27439305-1

2.Fastening of new or existing steel deck forming part of a wall anchorage system.

Section ID: text-id-27439305-2

3.Installation of continuity connectors along the length of crossties, to ensure compliance with Section A206.2. This inspection may be periodic special inspection.

Section ID: text-id-27439305-3

Testing shall show that the existing anchors can sustain a test load of 1.5 times the design tension load without noticeable deformation or damage to the anchor, to the masonry or concrete element, or to any part of the existing load path between the anchor and new retrofit components. Three anchors of each existing detail type shall be tested, and all three shall satisfy the requirement. Prior to testing, the design professional shall submit a test plan for code official approval identifying the expected locations of the existing anchors in question, the locations of the proposed tests, and the test procedure and criteria. After testing, the design professional shall submit a report of the satisfactory testing showing the test results, the design strengths derived from them, and the size and spacing as confirmed by investigation.

Section ID: text-id-27439307-0

Structural testing and inspection for new construction materials, submittals, reports and certificates of compliance shall be in accordance with Sections 1704 and 1705 of the International Building Code. Work done to comply with this chapter shall not be eligible for Exception 1 to Section 1704.2 of the International Building Code or Exception 2 to Section 1705.13 of the International Building Code.

Section ID: text-id-27439310-0

Concrete and masonry walls shall be anchored to all floors and roofs that provide lateral support for the wall in accordance with Section 12.11.2 of ASCE 7. The anchorage shall provide a direct connection capable of resisting 75 percent of the forces specified in Section 12.11.2.1 of ASCE 7.

Section ID: text-id-27439314-0

Exceptions:

Section ID: text-id-27439314-1

1. Existing walls need not be evaluated or retrofitted for bending between anchors.

Section ID: text-id-27439314-2

2. Work required by this chapter need not consider shrinkage, thermal changes or differential settlement.

Section ID: text-id-27439314-3

For any site designated as Site Class E, the value of Fa shall be taken as 1.2. Site-specific procedures are not required for compliance with this chapter. Mitigation of existing geologic site hazards such as liquefiable soil, fault rupture or landslide is not required for compliance with this chapter.

Section ID: text-id-27439315-0

The wall anchorage system shall comply with the requirements of this section and Section 12.11.2.2 of ASCE 7.

Section ID: text-id-27439318-0

The maximum spacing between wall anchors shall be 8 feet (2438 mm), and each wall segment shall have at least two wall anchors.

Section ID: text-id-27439318-1

The wall anchorage system, excluding subdiaphragms and existing roof or floor framing members, shall be designed and installed to limit the relative movement between the wall and the diaphragm to no more than 1/8 inch before engagement of the anchors. Wall anchors shall be provided to resist out-of-plane forces, independent of existing shear anchors.

Section ID: text-id-27439318-2

Where new members are added as crossties, they shall be spaced no more than 24 feet (7315 mm) apart. Where existing girders are used as crossties, their actual spacing shall be deemed adequate even where the spacing exceeds 24 feet (7315 mm), as long as the girders are provided with continuity connectors as required.

Section ID: text-id-27439318-3

Wall anchorage shall not be provided by fastening the edge of plywood sheathing to steel ledgers. Wall anchorage shall not be provided solely by fastening the edge of steel decking to steel ledgers unless analysis demonstrates acceptable capacity. The existing connections shall be subject to field verification and the new connections shall be subject to special inspection.

Section ID: text-id-27439318-4

New wall anchors shall be provided to resist the full wall anchorage design force independent of existing shear or tension anchors.

Section ID: text-id-27439318-5

Exception: Existing cast-in-place anchors shall be permitted as part of the wall anchorage system if the tie element can be readily attached to the anchors, and if the anchors are capable of resisting the total vertical and lateral shear load (including dead load) while being acted on by the maximum wall anchorage tension force caused by an earthquake. Acceptable tension values for the existing anchors shall be established by testing in accordance with Section A205.4.

Section ID: text-id-27439318-6

Development of the required anchorage forces into roof and floor diaphragms shall comply with the requirements of this section and Section 12.11.2.2 of ASCE 7.

Section ID: text-id-27439320-0

Lengths of development of anchor loads in wood diaphragms shall be based on existing field nailing of the sheathing unless existing edge nailing is positively identified on the original construction plans or at the site.

Section ID: text-id-27439320-1

Where pilasters are present, the wall anchorage system shall comply with the requirements of this section and Section 12.11.2.2.7 of ASCE 7. The pilasters or the walls immediately adjacent to the pilasters shall be anchored directly to the roof framing such that the existing vertical anchor bolts at the top of the pilasters are bypassed without permitting tension or shear failure at the top of the pilasters.

Section ID: text-id-27439322-0

Exception: If existing vertical anchor bolts at the top of the pilasters are used for the anchorage, additional exterior confinement shall be provided as required to resist the total anchorage force.

Section ID: text-id-27439322-1

New anchors used in combination on a single framing member shall be of compatible behavior and stiffness.

Section ID: text-id-27439324-0

Existing interior reinforced concrete or reinforced masonry walls that extend to the floor above or to the roof diaphragm shall be anchored for out-of-plane forces per Sections A206.1 and A206.3. Walls extending through the roof diaphragm shall be anchored for out-of-plane forces on both sides, and continuity ties shall be spliced across or continuous through the interior wall to provide diaphragm continuity.

Section ID: text-id-27439326-0

Collectors designed in accordance with this section shall be provided at reentrant corners and at interior shear walls. Existing or new collectors shall have the capacity to develop into the diaphragm a force equal to the lesser of the rocking or shear capacity of the reentrant wall or the tributary shear based on 75 percent of the diaphragm design forces specified in Section 12.10 of ASCE 7. The capacity of the collector need not exceed the capacity of the diaphragm to deliver loads to the collector. A connection shall be provided from the collector to the reentrant wall to transfer the full collector internal force . If a truss or beam other than a rafter or purlin is supported by the reentrant wall or by a column integral with the reentrant wall, then an independent secondary column is required to support the roof or floor members whenever rocking or shear capacity of the reentrant wall is less than the tributary shear.

Section ID: text-id-27439328-0

Existing mezzanines relying on reinforced concrete or reinforced masonry walls for vertical or lateral support shall be anchored to the walls for the tributary mezzanine load. Walls depending on the mezzanine for lateral support shall be anchored per Sections A206.1, A206.2 and A206.3.

Section ID: text-id-27439330-0

Exception: Existing mezzanines that have independent lateral and vertical support need not be anchored to the walls.

Section ID: text-id-27439330-1

Materials permitted by the building code, including their appropriate strength or allowable stresses, shall be used to meet the requirements of this chapter.

Section ID: text-id-27439334-0

The provisions of this chapter are intended to promote public safety and welfare by reducing the risk of earthquake-induced damage to existing wood-frame residential buildings. The requirements contained in this chapter are prescriptive minimum standards intended to improve the seismic performance of residential buildings; however, they will not necessarily prevent earthquake damage.

Section ID: text-id-27439340-0

This chapter sets standards for strengthening that may be approved by the code official without requiring plans or calculations prepared by a registered design professional. The provisions of this chapter are not intended to prevent the use of any material or method of construction not prescribed herein. The code official may require that construction documents for strengthening using alternative materials or methods be prepared by a registered design professional.

Section ID: text-id-27439340-1

The provisions of this chapter apply to residential buildings of light-frame wood construction containing one or more of the structural weaknesses specified in Section A303.

Section ID: text-id-27439342-0

Exception: The provisions of this chapter do not apply to the buildings, or elements thereof, listed as follows. These buildings or elements require analysis by a registered design professional in accordance with Section A301.3 to determine appropriate strengthening:

Section ID: text-id-27439342-1

1.Group R-1.

Section ID: text-id-27439342-2

2.Group R with more than four dwelling units.

Section ID: text-id-27439342-3

3.Buildings with a lateral force-resisting system using poles or columns embedded in the ground.

Section ID: text-id-27439342-4

4.Cripple walls that exceed 4 feet (1219 mm) in height.

Section ID: text-id-27439342-5

5.Buildings exceeding three stories in height and any three-story building with cripple wall studs exceeding 14 inches (356 mm) in height.

Section ID: text-id-27439342-6

6.Buildings where the code official determines that conditions exist that are beyond the scope of the prescriptive requirements of this chapter.

Section ID: text-id-27439342-7

7.Buildings or portions thereof constructed on concrete slabs on grade.

Section ID: text-id-27439342-8

The details and prescriptive provisions herein are not intended to be the only acceptable strengthening methods permitted. Alternative details and methods shall be permitted to be used where approved by the code official. Approval of alternatives shall be based on a demonstration that the method or material used is at least equivalent in terms of strength, deflection and capacity to that provided by the prescriptive methods and materials.

Section ID: text-id-27439344-0

Where analysis by a registered design professional is required, such analysis shall be in accordance with all requirements of the building code, except that the seismic forces may be taken as 75 percent of those specified in the International Building Code.

Section ID: text-id-27439344-1

For the purpose of this chapter, in addition to the applicable definitions in the building code, certain additional terms are defined as follows:

Section ID: text-id-27439348-0

[BS]ADHESIVE ANCHOR. An assembly consisting of a threaded rod, washer, nut, and chemical adhesive approved by the code official for installation in existing concrete or masonry.

Section ID: text-id-27439348-1

[BS]CRIPPLE WALL. A wood-frame stud wall extending from the top of the foundation to the underside of the lowest floor framing.

Section ID: text-id-27439348-2

[BS]EXPANSION ANCHOR. An approved post-installed anchor, inserted into a predrilled hole in existing concrete or masonry, that transfers loads to or from the concrete or masonry by direct bearing or friction or both.

Section ID: text-id-27439348-3

[BS]PERIMETER FOUNDATION. A foundation system that is located under the exterior walls of a building.

Section ID: text-id-27439348-4

[BS]SNUGTIGHT. As tight as an individual can torque a nut on a bolt by hand, using a wrench with a 10-inch-long (254 mm) handle, and the point at which the full surface of the plate washer is contacting the wood member and slightly indenting the wood surface.

Section ID: text-id-27439348-5

[BS]WOOD STRUCTURAL PANEL. A panel manufactured from veneers, wood strands or wafers or a combination of veneer and wood strands or wafers bonded together with waterproof synthetic resins or other suitable bonding systems. Examples of wood structural panels are:

Section ID: text-id-27439348-6

Composite panels. A wood structural panel that is comprised of wood veneer and reconstituted wood-based material and bonded together with waterproof adhesive.

Section ID: text-id-27439348-7

Oriented strand board (OSB). A mat-formed wood structural panel comprised of thin rectangular wood strands arranged in cross-aligned layers with surface layers normally arranged in the long panel direction and bonded with waterproof adhesive.

Section ID: text-id-27439348-8

Plywood. A wood structural panel comprised of plies of wood veneer arranged in cross-aligned layers. The plies are bonded with waterproof adhesive that cures on application of heat and pressure.

Section ID: text-id-27439348-9

For the purposes of this chapter, any of the following conditions shall be deemed a structural weakness:

Section ID: text-id-27439352-0

1.Sill plates or floor framing that are supported directly on the ground without a foundation system that conforms to the building code.

Section ID: text-id-27439352-1

2.A perimeter foundation system that is constructed only of wood posts supported on isolated pad footings.

Section ID: text-id-27439352-2

3.Perimeter foundation systems that are not continuous.

Section ID: text-id-27439352-3

Exceptions:

Section ID: text-id-27439352-4

1.Existing single-story exterior walls not exceeding 10 feet (3048 mm) in length, forming an extension of floor area beyond the line of an existing continuous perimeter foundation.

Section ID: text-id-27439352-5

2.Porches, storage rooms and similar spaces not containing fuel-burning appliances.

Section ID: text-id-27439352-6

4.A perimeter foundation system that is constructed of unreinforced masonry or stone.

Section ID: text-id-27439352-7

5.Sill plates that are not connected to the foundation or that are connected with less than what is required by the building code.

Section ID: text-id-27439352-8

Exception: Where approved by the code official, connections of a sill plate to the foundation made with other than sill bolts shall be accepted if the capacity of the connection is equivalent to that required by the building code.

Section ID: text-id-27439352-9

6.Cripple walls that are not braced in accordance with the requirements of Section A304.4 and Table A304.3.1, or cripple walls not braced with diagonal sheathing or wood structural panels in accordance with the building code.

Section ID: text-id-27439352-10

The structural weaknesses noted in Section A303 shall be strengthened in accordance with the requirements of this section. Strengthening work may include both new construction and alteration

of existing construction. Except as provided herein, all strengthening work and materials shall comply with the applicable provisions of the International Building Code.

Section ID: text-id-27439357-0

Existing wood materials that will be a part of the strengthening work (such as sills, studs and sheathing) shall be in a sound condition and free from defects that substantially reduce the capacity of the member. Any wood material found to contain fungus infection shall be removed and replaced with new material. Any wood material found to be infested with insects or to have been infested with insects shall be strengthened or replaced with new materials to provide a net dimension of sound wood equal to or greater than its undamaged original dimension.

Section ID: text-id-27439359-0

Floor joists framed perpendicular or at an angle to perimeter foundations shall be restrained either by an existing nominal 2-inch-wide (51 mm) continuous rim joist or by a nominal 2-inch-wide (51 mm) full-depth block between alternate joists in one- and two-story buildings, and between each joist in three-story buildings. Existing blocking for multiple-story buildings must occur at each joist space above a braced cripple wall panel.

Section ID: text-id-27439361-0

Existing connections at the top and bottom edges of an existing rim joist or blocking need not be verified in ones tory buildings. In multiple-story buildings, the existing top edge connection need not be verified; however, the bottom edge connection to either the foundation sill plate or the top plate of a cripple wall shall be verified. The minimum existing bottom edge connection shall consist of 8d toenails spaced 6 inches (152 mm) apart for a continuous rim joist, or three 8d toenails per block. Where this minimum bottom edge-connection is not present or cannot be verified, a supplemental connection installed as shown in Figure A304.1.3 or A304.1.4(2) shall be provided.

Section ID: text-id-27439361-1

Where an existing continuous rim joist or the minimum existing blocking does not occur, new 3/4-inch (19.1 mm) or 23/32-inch (18 mm) wood structural panel blocking installed tightly between floor joists and nailed as shown in Figure A304.1.4(3) shall be provided at the inside face of the cripple wall. In lieu of wood structural panel blocking, tight fitting, full-depth 2-inch (51 mm) blocking may be used. New blocking may be omitted where it will interfere with vents or plumbing that penetrates the wall.

Section ID: text-id-27439361-2

For SI: 1 inch = 25.4 mm, 1 pound = 4.4 N.

Section ID: text-id-27439364-0

NOTE: See manufacturing instructions for nail sizes associated with metal framing clips.

Section ID: text-id-27439364-1

[BS] FIGURE A304.1.3

Section ID: text-id-27439364-2

TYPICAL FLOOR TO CRIPPLE WALL CONNECTION (FLOOR JOISTS NOT PARALLEL TO FOUNDATIONS)

Section ID: text-id-27439364-3

Where existing floor joists are parallel to the perimeter foundations, the end joist shall be located over the foundation and, except for required ventilation openings, shall be continuous and in continuous contact with the foundation sill plate or the top plate of the cripple wall. Existing connections at the top and bottom edges of the end joist need not be verified in one-story buildings. In multiple-story buildings, the existing top edge connection of the end joist need not be verified; however, the bottom edge connection to either the foundation sill plate or the top plate of a cripple wall shall be verified. The minimum bottom edge connection shall be 8d toenails spaced 6 inches (152 mm) apart. If this minimum bottom edge connection is not present or cannot be verified, a supplemental connection installed as shown in Figure A304.1.4(1), A304.1.4(2) or A304.1.4(3) shall be provided.

Section ID: text-id-27439366-0

For SI: 1 inch = 25.4 mm, 1 pound = 4.4 N.

Section ID: text-id-27439369-0

NOTE: See manufacturing instructions for nail sizes associated with metal framing clips.

Section ID: text-id-27439369-1

[BS] FIGURE A304.1.4(1)

Section ID: text-id-27439369-2

TYPICAL FLOOR TO CRIPPLE WALL CONNECTION (FLOOR JOISTS PARALLEL TO FOUNDATIONS)

Section ID: text-id-27439369-3

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27439372-0

NOTES:

Section ID: text-id-27439372-1

1.See Section A304.3 for sill plate anchorage.

Section ID: text-id-27439372-2

2.See manufacturing instructions for nail sizes associated with metal framing clips.

Section ID: text-id-27439372-3

[BS] FIGURE A304.1.4(2)

Section ID: text-id-27439372-4

TYPICAL FLOOR TO MUDSILL CONNECTIONS

Section ID: text-id-27439372-5

For SI: 1 inch = 25.4 mm, 1 pound = 4.4 N.

Section ID: text-id-27439375-0

NOTE: See Section A304.4 for cripple wall bracing.

Section ID: text-id-27439375-1

[BS] FIGURE A304.1.4(3)

Section ID: text-id-27439375-2

ALTERNATIVE FLOOR FRAMING TO CRIPPLE WALL CONNECTION

Section ID: text-id-27439375-3

New perimeter foundations shall be provided for structures with the structural weaknesses noted in Items 1 and 2 of Section A303. Soil investigations or geotechnical studies are not required for this work unless the building is located in a special study zone as designated by the code official or other authority having jurisdiction.

Section ID: text-id-27439379-0

Partial perimeter foundations or unreinforced masonry foundations shall be evaluated by a registered design professional for the force levels specified in Section A301.3. Test reports or other substantiating data to determine existing foundation material strengths shall be submitted to the code official. Where approved by the code official, these existing foundation systems shall be strengthened in accordance with the recommendations included with the evaluation in lieu of being replaced.

Section ID: text-id-27439381-0

Exception: In lieu of testing existing foundations to determine material strengths, and where approved by the code official, a new nonperimeter foundation system designed for the forces specified in Section A301.3 shall be used to resist lateral forces from perimeter walls. A registered design professional shall confirm the ability of the existing diaphragm to transfer seismic forces to the new nonperimeter foundations.

Section ID: text-id-27439381-1

All new perimeter foundations shall be continuous and constructed according to Figure A304.2.3(1) and Table A304.2.3(1) or Figure A304.2.3(2) and Table A304.2.3(2). New construction materials shall comply with the requirements of building code. Where approved by the code official, the existing clearance between existing floor joists or girders and existing grade below the floor need not comply with the building code.

Section ID: text-id-27439383-0

Exception: Where designed by a registered design professional and approved by the code official, partial perimeter foundations shall be used in lieu of a continuous perimeter foundation.

Section ID: text-id-27439383-1

[BS] TABLE A304.2.3(1)

Section ID: text-id-27439384-0

NEW REINFORCED CONCRETE FOUNDATION SYSTEM

Section ID: text-id-27439384-1

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27439421-0

a.Where frost conditions occur, the minimum depth shall extend below the frost line.

Section ID: text-id-27439421-1

b.The ground surface along the interior side of the foundation may be excavated to the elevation of the top of the footing.

Section ID: text-id-27439421-2

c.Where the soil is designated as expansive, the foundation depth and reinforcement shall be approved by the code official.

Section ID: text-id-27439421-3

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Section ID: text-id-27439424-0

[BS] FIGURE A304.2.3(1)

Section ID: text-id-27439424-1

NEW REINFORCED CONCRETE FOUNDATION SYSTEM

Section ID: text-id-27439424-2

[BS] TABLE A304.2.3(2)

Section ID: text-id-27439425-0

NEW MASONRY CONCRETE FOUNDATION

Section ID: text-id-27439425-1

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27439461-0

a.Where frost conditions occur, the minimum depth shall extend below the frost line.

Section ID: text-id-27439461-1

b.The ground surface along the interior side of the foundation may be excavated to the elevation of the top of the footing.

Section ID: text-id-27439461-2

c.Where the soil is designated as expansive, the foundation depth and reinforcement shall be approved by the code official.

Section ID: text-id-27439461-3

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Section ID: text-id-27439464-0

[BS] FIGURE A304.2.3(2)

Section ID: text-id-27439464-1

NEW MASONRY CONCRETE FOUNDATION

Section ID: text-id-27439464-2

New concrete foundations shall have a minimum compressive strength of 2,500 pounds per square inch (17.24 MPa) at 28 days.

Section ID: text-id-27439466-0

New hollow-unit masonry foundations shall be solidly grouted. The grout shall have minimum compressive strength of 2,000 pounds per square inch (13.79 MPa). Mortar shall be Type M or S.

Section ID: text-id-27439468-0

Where new sill plates are used in conjunction with new foundations, they shall be minimum two times nominal thickness and shall be preservative-treated wood or naturally durable wood permitted by the building code for similar applications, and shall be marked or branded by an approved agency. Fasteners in contact with preservative-treated wood shall be hot-dip galvanized or other material permitted by the building code for similar applications. Anchors, that attach a preservative-treated sill plate to the foundation, shall be permitted to be of mechanically deposited zinc-coated steel with coating weights in accordance with ASTM B695, Class 55 minimum. Metal framing anchors in contact with preservative-treated wood shall be galvanized in accordance with ASTM A653 with a G185 coating.

Section ID: text-id-27439470-0

Where the building has an existing continuous perimeter foundation, all perimeter wall sill plates shall be anchored to the foundation with adhesive anchors or expansion anchors in accordance with Table A304.3.1.

Section ID: text-id-27439474-0

Anchors shall be installed in accordance with Figure A304.3.1(1), with the plate washer installed between the nut and the sill plate. The nut shall be tightened to a snugtight condition after curing is complete for adhesive anchors and after expansion wedge engagement for expansion anchors. Anchors shall be installed in accordance with manufacturer’s recommendations. Expansion anchors shall not be used where the installation causes surface cracking of the foundation wall at the locations of the anchor.

Section ID: text-id-27439474-1

Where existing conditions prevent anchor installations through the top of the sill plate, this connection shall be made in accordance with Figure A304.3.1(2), A304.3.1(3) or A304.3.1(4). Alternative anchorage methods having a minimum shear capacity of 900 pounds (4003 N) per connection parallel to the wall shall be permitted. The spacing of these alternative connections shall comply with the maximum spacing requirements of Table A304.3.1 for 1/2-inch (12.7 mm) bolts.

Section ID: text-id-27439474-2

[BS] TABLE A304.3.1

Section ID: text-id-27439475-0

SILL PLATE ANCHORAGE AND CRIPPLE WALL BRACING

Section ID: text-id-27439475-1

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 47.88 N/m2.

Section ID: text-id-27439494-0

a.Sill plate anchors shall be adhesive anchors or expansion anchors in accordance with Section A304.3.1.

Section ID: text-id-27439494-1

b.All washer plates shall be 3 inches by 3 inches by 0.229 inch minimum. The hole in the plate washer is permitted to be diagonally slotted with a width of up to 3/16 inch larger than the bolt diameter and a slot length not to exceed 13/4 inches, provided that a standard cut washer is placed between the plate washer and the nut.

Section ID: text-id-27439494-2

c. This table shall also be permitted for the spacing of the alternative connections specified in Section A304.3.1.

Section ID: text-id-27439494-3

d.See Figure A304.4.2 for braced panel layout.

Section ID: text-id-27439494-4

e.Braced panels at ends of walls shall be located as near to the end as possible.

Section ID: text-id-27439494-5

f.All panels along a wall shall be nearly equal in length and shall be nearly equal in spacing along the length of the wall.

Section ID: text-id-27439494-6

g.The minimum required underfloor ventilation openings are permitted in accordance with Section A304.4.4.

Section ID: text-id-27439494-7

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27439497-0

a.Plate washers shall comply with the following:

Section ID: text-id-27439497-1

1/2-inch anchor or bolt—3 inches × 3 inches × 0.229 inch minimum.

Section ID: text-id-27439497-2

5/8-inch anchor or bolt—3 inches × 3 inches × 0.229 inch minimum.

Section ID: text-id-27439497-3

A diagonal slot in the plate washer is permitted in accordance with Table A304.3.1, Note b.

Section ID: text-id-27439497-4

b.See Figure A304.4.1(1) or A304.4.1(2) for cripple wall bracing.

Section ID: text-id-27439497-5

[BS] FIGURE A304.3.1(1)

Section ID: text-id-27439497-6

SILL PLATE BOLTING TO EXISTING FOUNDATIONa, b

Section ID: text-id-27439497-7

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27439500-0

NOTES:

Section ID: text-id-27439500-1

a.If shim space exceeds 11/2 inches, alternative details will be required.

Section ID: text-id-27439500-2

b.Where required, single piece shim shall be naturally durable wood or preservative-treated wood. If preservative-treated wood is used, it shall be isolated from the foundation system with a moisture barrier.

Section ID: text-id-27439500-3

[BS] FIGURE A304.3.1(2)

Section ID: text-id-27439500-4

ALTERNATIVE SILL PLATE ANCHORING IN EXISTING FOUNDATION—WITHOUT CRIPPLE WALLS AND FLOOR FRAMING NOT PARALLEL TO FOUNDATIONSa, b

Section ID: text-id-27439500-5

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27439503-0

[BS] FIGURE A304.3.1(3)

Section ID: text-id-27439503-1

ALTERNATIVE SILL PLATE ANCHOR TO EXISTING FOUNDATION WITHOUT CRIPPLE WALL AND FLOOR FRAMING PARALLEL TO FOUNDATIONS

Section ID: text-id-27439503-2

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27439506-0

[BS] FIGURE A304.3.1(4)

Section ID: text-id-27439506-1

SILL PLATE ANCHORING TO EXISTING FOUNDATION—ALTERNATIVE CONNECTION FOR BATTERED FOOTING

Section ID: text-id-27439506-2

Anchors shall be placed within 12 inches (305 mm), but not less than 9 inches (229 mm), from the ends of sill plates and shall be placed in the center of the stud space closest to the required spacing. New sill plates may be installed in pieces where necessary because of existing conditions. For lengths of sill plates 12 feet (3658 mm) or greater, anchors shall be spaced along the sill plate as specified in Table A304.3.1. For other lengths of sill plate, anchor placement shall be in accordance with Table A304.3.2.

Section ID: text-id-27439508-0

Exception: Where physical obstructions such as fireplaces, plumbing or heating ducts interfere with the placement of an anchor, the anchor shall be placed as close to the obstruction as possible, but not less than 9 inches (229 mm) from the end of the plate. Center-to-center spacing of the anchors shall be reduced as necessary to provide the minimum total number of anchors

required based on the full length of the wall. Center-to-center spacing shall be not less than 12 inches (305 mm).

Section ID: text-id-27439508-1

[BS] TABLE A304.3.2

Section ID: text-id-27439509-0

SILL PLATE ANCHORAGE FOR VARIOUS LENGTHS OF SILL PLATEa, b

Section ID: text-id-27439509-1

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Section ID: text-id-27439528-0

a.Connections shall be either adhesive anchors or expansion anchors.

Section ID: text-id-27439528-1

b.See Section A304.3.2 for minimum end distances.

Section ID: text-id-27439528-2

c.Connections shall be placed as near to the center of the length of plate as possible.

Section ID: text-id-27439528-3

Sill plates for new perimeter foundations shall be anchored in accordance with Table A304.3.1 and Figure A304.2.3(1) and Table A304.2.3(1) or Figure A304.2.3(2) and Table A304.2.3(2).

Section ID: text-id-27439530-0

Exterior cripple walls not exceeding 4 feet (1219 mm) in height shall be permitted to be specified by the prescriptive bracing method in Section A304.4. Cripple walls over 4 feet (1219 mm) in height require analysis by a registered design professional in accordance with Section A301.3.

Section ID: text-id-27439534-0

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27439537-0

NOTE: See Figure A304.3.1(1) for sill plate anchoring.

Section ID: text-id-27439537-1

[BS] FIGURE A304.4.1(1)

Section ID: text-id-27439537-2

CRIPPLE WALL BRACING WITH NEW WOOD STRUCTURAL PANEL ON EXTERIOR FACE OF CRIPPLE STUDS

Section ID: text-id-27439537-3

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27439540-0

[BS] FIGURE A304.4.1(2)

Section ID: text-id-27439540-1

CRIPPLE WALL BRACING WITH WOOD STRUCTURAL PANEL ON INTERIOR FACE OF CRIPPLE STUDS

Section ID: text-id-27439540-2

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27439543-0

[BS] FIGURE A304.4.1(3)

Section ID: text-id-27439543-1

PARTIAL CRIPPLE STUD WALL ELEVATION

Section ID: text-id-27439543-2

Wood structural panel sheathing shall be not less than 15/32-inch (12 mm) thick and shall be installed in accordance with Figure A304.4.1(1) or A304.4.1(2). Individual pieces of wood structural panels shall be nailed with 8d common nails spaced 4 inches (102 mm) on center at all edges and 12 inches (305 mm) on center at each intermediate support with not less than two nails for each stud. Nails shall be driven so that their heads are flush with the surface of the sheathing and shall penetrate the supporting member not less than 11/2 inches (38 mm). When a nail fractures the surface, it shall be left in place and not counted as part of the required nailing. A new 8d nail shall be located within 2 inches (51 mm) of the discounted nail and be hand-driven flush with the sheathing surface. Where the installation involves horizontal joints, those joints shall occur over nominal 2-inch by 4-inch (51 mm by 102 mm) blocking installed with the nominal 4-inch (102 mm) dimension against the face of the plywood.

Section ID: text-id-27439544-0

Vertical joints at adjoining pieces of wood structural panels shall be centered on studs such that there is a minimum 1/8 inch (3.2 mm) between the panels. Where required edge distances cannot be maintained because of the width of the existing stud, a new stud shall be added adjacent to the existing studs and connected in accordance with Figure A304.4.1(3).

Section ID: text-id-27439544-1

See Table A304.3.1 and Figure A304.4.2 for the distribution and amount of bracing required for each wall line. Each braced panel length must be not less than two times the height of the cripple stud. Where the minimum amount of bracing prescribed in Table A304.3.1 cannot be installed along any walls, the bracing must be designed in accordance with Section A301.3.

Section ID: text-id-27439547-0

Exception: Where physical obstructions such as fireplaces, plumbing or heating ducts interfere with the placement of cripple wall bracing, the bracing shall then be placed as close to the obstruction as possible. The total amount of bracing required shall not be reduced because of obstructions.

Section ID: text-id-27439547-1

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 42.88 N/m2.

Section ID: text-id-27439550-0

[BS] FIGURE A304.4.2

Section ID: text-id-27439550-1

FLOOR PLAN-CRIPPLE WALL BRACING LAYOUT

Section ID: text-id-27439550-2

Where bracing materials are installed on the interior face of studs forming an enclosed space between the new bracing and the existing exterior finish, each braced stud space must be ventilated. Adequate ventilation and access for future inspection shall be provided by drilling one 2-inch to 3- inch-diameter (51 mm to 76 mm) round hole through the sheathing, nearly centered between each stud at the top and bottom of the cripple wall. Such holes should be spaced not less than 1 inch (25 mm) clear from the sill or top plates. In stud spaces containing sill bolts, the hole shall be located on the centerline of the sill bolt but not closer than 1 inch (25 mm) clear from the nailing edge of the sheathing. Where existing blocking occurs within the stud space, additional ventilation holes shall be placed above and below the blocking, or the existing block shall be removed and a new nominal 2-inch by 4-inch (51 mm by 102 mm) block shall be installed with the nominal 4- inch (102 mm) dimension against the face of the plywood. For stud heights less than 18 inches (457 mm), only one ventilation hole need be provided.

Section ID: text-id-27439552-0

Existing underfloor ventilation shall not be reduced without providing equivalent new ventilation as close to the existing ventilation as possible. Braced panels may include underfloor ventilation openings where the height of the opening, measured from the top of the foundation wall to the top of the opening, does not exceed 25 percent of the height of the cripple stud wall; however, the length of the panel shall be increased a distance equal to the length of the opening or one stud space minimum. Where an opening exceeds 25 percent of the cripple wall height, braced panels shall not be located where the opening occurs. See Figure A304.4.1(3).

Section ID: text-id-27439554-0

Exception: For homes with a post and pier foundation system where a new continuous perimeter foundation system is being installed, new ventilation shall be provided in accordance with the building code.

Section ID: text-id-27439554-1

All work shall be subject to inspection by the code official including, but not limited to:

Section ID: text-id-27439557-0

1.Placement and installation of new adhesive or expansion anchors installed in existing foundations. Special inspection is not required for adhesive anchors installed in existing foundations regulated by the prescriptive provisions of this chapter.

Section ID: text-id-27439557-1

2.Installation and nailing of new cripple wall bracing.

Section ID: text-id-27439557-2

3.Any work shall be subject to special inspection where required by the code official in accordance with the building code.

Section ID: text-id-27439557-3

All nails specified in this chapter shall be common wire nails of the following diameters and lengths:

Section ID: text-id-27439558-0

1.8d nails = 0.131 inch (3.3 mm) by 21/2 inches (64 mm).

Section ID: text-id-27439558-1

2.10d nails = 0.148 inch (3.8 mm) by 3 inches (76 mm).

Section ID: text-id-27439558-2

3.12d nails = 0.148 inch (3.8 mm) by 31/4 inches (83 mm).

Section ID: text-id-27439558-3

4.16d nails = 0.162 inch (4.1 mm) by 31/2 inches (89 mm).

Section ID: text-id-27439558-4

Nails used to attach metal framing connectors directly to wood members shall be as specified by the connector manufacturer in an approved report.

Section ID: text-id-27439558-5

The purpose of this chapter is to promote public welfare and safety by reducing the risk of death or injury as a result of the effects of earthquakes on existing wood-frame, multiple-unit residential buildings. The ground motions of past earthquakes have caused the loss of human life, personal injury and property damage in these types of buildings. This chapter creates minimum standards to strengthen the more vulnerable portions of these structures. Where fully followed, these minimum standards will improve the performance of these buildings but will not necessarily prevent all earthquake-related damage.

Section ID: text-id-27439565-0

The provisions of this chapter apply to existing buildings of wood construction that contain residential occupancies and are assigned to Risk Category II, and where the structure has a soft, weak or open-front wall line, and there exists one or more stories above.

Section ID: text-id-27439567-0

Notwithstanding the applicable definitions, symbols and notations in the building code, the following definitions shall apply for the purposes of this chapter:

Section ID: text-id-27439571-0

[BS] ASPECT RATIO. The span-width ratio for horizontal diaphragms and the height-length ratio for shear walls.

Section ID: text-id-27439571-1

[BS] NONCONFORMING STRUCTURAL MATERIALS. Wall bracing materials other than wood structural panels or diagonal sheathing.

Section ID: text-id-27439571-3

[BS] OPEN-FRONT WALL LINE. An exterior wall line, without vertical elements of the lateral force-resisting system, that requires tributary seismic forces to be resisted by diaphragm rotation or excessive cantilever beyond parallel lines of shear walls. Diaphragms that cantilever more than 25 percent of the distance between lines of lateral force-resisting elements from which the diaphragm cantilevers shall be considered to be excessive. Exterior exit balconies of 6 feet (1829 mm) or less in width shall not be considered excessive cantilevers.

Section ID: text-id-27439571-4

[BS] RETROFIT. An improvement of the lateral force-resisting system by alteration of existing structural elements or addition of new structural elements.

Section ID: text-id-27439571-5

[BS] SOFT WALL LINE. A wall line whose lateral stiffness is less than that required by story drift limitations or deformation compatibility requirements of this chapter. In lieu of analysis, a soft wall line may be defined as a wall line in a story where the story stiffness is less than 70 percent of the story above for the direction under consideration.

Section ID: text-id-27439571-6

[BS] STORY. A story as defined by the building code, including any basement or underfloor space of a building with cripple walls exceeding 4 feet (1219 mm) in height.

Section ID: text-id-27439571-7

[BS] WALL LINE. Any length of wall along a principal axis of the building used to provide resistance to lateral loads. Parallel wall lines separated by less than 4 feet (1219 mm) shall be considered to be one wall line for the distribution of loads.

Section ID: text-id-27439571-9

[BS] WEAK WALL LINE. A wall line in a story where the story strength is less than 80 percent of the story above in the direction under consideration.

Section ID: text-id-27439571-10

Modifications required by the provisions in this chapter shall be designed in accordance with the International Building Code provisions for new construction, except as modified by this chapter.

Section ID: text-id-27439575-0

Exception: Buildings for which the prescriptive measures provided in Section A404 apply and are used.

Section ID: text-id-27439575-1

Alteration of the existing lateral force-resisting system or vertical load-carrying system shall not reduce the strength or stiffness of the existing structure, unless the altered structure would remain in conformance to the building code and this chapter.

Section ID: text-id-27439575-2

This chapter requires the alteration, repair, replacement or addition of structural elements and their connections to meet the strength and stiffness requirements herein. The lateral load-path analysis shall include the resisting elements and connections from the wood diaphragm immediately above any soft, weak or open-front wall lines to the foundation soil interface or to the uppermost story of a podium structure comprised of steel, masonry, or concrete structural systems that supports the upper wood-framed structure. Stories above the uppermost story with a soft, weak or open-front wall line shall be considered in the analysis but need not be modified. The lateral load-path analysis for added structural elements shall include evaluation of the allowable soil-bearing and lateral pressures in accordance with the building code. Where any portion of a building within the scope of this chapter is constructed on or into a slope steeper than one unit vertical in three units horizontal (33-percent slope), the lateral force-resisting system at and below the base level diaphragm shall be analyzed for the effects of concentrated lateral forces at the base caused by this hillside condition.

Section ID: text-id-27439577-0

The design base shear in a given direction shall be permitted to be 75 percent of the value required for similar new construction in accordance with the building code. The value of R used in the design of the strengthening of any story shall not exceed the lowest value of R used in the same direction at any story above. The system overstrength factor, Ω0, and the deflection amplification factor, Cd, shall be not less than the largest respective value corresponding to the R factor being used in the direction under consideration.

Section ID: text-id-27439579-0

Exceptions:

Section ID: text-id-27439579-1

1.For structures assigned to Seismic Design Category B, values of R, Ω0 and Cd shall be permitted to be based on the seismic force-resisting system being used to achieve the required strengthening.

Section ID: text-id-27439579-2

2.For structures assigned to Seismic Design Category C or D, values of R, Ω0 and Cd shall be permitted to be based on the seismic force-resisting system being used to achieve the required strengthening, provided that when the strengthening is complete, the strengthened structure will not have an extreme weak story irregularity defined as Type 5b in ASCE 7 Table 12.3-2.

Section ID: text-id-27439579-3

3.For structures assigned to Seismic Design Category E, values of R, Ω0 and Cd shall be permitted to be based on the seismic force-resisting system being used to achieve the required strengthening, provided that when the strengthening is complete, the strengthened structure will not have an extreme soft story, a weak story, or an extreme weak story irregularity defined, respectively, as Types 1b, 5a and 5b in ASCE 7 Table 12.3-2.

Section ID: text-id-27439579-4

4.For retrofit systems involving different seismic force-resisting systems in the same direction within the same story, resisting elements are permitted to be designed using the least value of R for the different structural systems found in each independent line of resistance if all of the following conditions are met:

Section ID: text-id-27439579-5

4.1.The building is assigned to Risk Category I or II.

Section ID: text-id-27439579-6

4.2.The building height is no more than four stories above grade plane.

Section ID: text-id-27439579-7

4.3.The seismic force-resisting systems of the retrofitted building comprise only wood structural panel shear walls, steel momentresisting frames, steel cantilever columns and steel-braced frames. Values for C and Ω0 shall be consistent with the R value used.

Section ID: text-id-27439579-8

5.With reference to ASCE 7 Table 12.2-1, ordinary, intermediate and special steel systems, and all light-frame systems shall be permitted without limitation where those systems are used only for

retrofit to comply with the requirements of this chapter.

Section ID: text-id-27439579-9

Despite any other requirement of Section A403.3 or A403.4, the total expected strength of retrofit elements added to any story need not exceed 1.7 times the expected strength of the story immediately above in a two-story building, or 1.3 times the expected strength of the story immediately above in a three-story or taller building, as long as the retrofit elements are located symmetrically about the center of mass of the story above, or so as to minimize torsion in the retrofitted story. Calculation of expected story strength and identification of irregularities in Section A403.3 shall be based on the expected strength of all wall lines, even if sheathed with nonconforming materials. The strength of a wall line above the retrofitted story shall be permitted to be reduced to account for inadequate load path or overturning resistance.

Section ID: text-id-27439580-0

For any site designated as Site Class E, the value of F shall be taken as 1.2. Site-specific procedures are not required for compliance with this chapter. Mitigation of existing geologic site hazards such as liquefiable soil, fault rupture or landslide is not required for compliance with this chapter.

Section ID: text-id-27439582-0

The calculated story drift for each retrofitted story shall not exceed the allowable deformation compatible with all vertical load-resisting elements and 0.025 times the story height. The calculated story drift shall not be reduced by the effects of horizontal diaphragm stiffness but shall be increased where these effects produce rotation. Drift calculations shall be in accordance with the building code.

Section ID: text-id-27439585-0

The effects of rotation and soil stiffness shall be included in the calculated story drift where lateral loads are resisted by vertical elements whose required depth of embedment is determined by pole formulas. The coefficient of subgrade reaction used in deflection calculations shall be based on a geotechnical investigation conducted in accordance with the building code.

Section ID: text-id-27439586-0

The requirements of the building code shall apply, except as modified herein. Structural framing elements and their connections not required by design to be part of the lateral force-resisting system shall be designed and detailed to be adequate to maintain support of expected gravity loads when subjected to the expected deformations caused by seismic forces. Increased demand caused by P Δ effects and story sidesway stability shall be considered in retrofit stories that rely on the strength and stiffness of cantilever columns for lateral resistance.

Section ID: text-id-27439589-0

All parts of the structure included in the scope of Section A403.2 shall be interconnected as required by the building code.

Section ID: text-id-27439591-0

Collector elements shall be provided to transfer the seismic forces between the elements within the scope of Section A403.2.

Section ID: text-id-27439593-0

Floor diaphragms within the scope of Section A403.2 shall be shown to have adequate strength at the following locations:

Section ID: text-id-27439595-0

1.For straight lumber sheathed diaphragms without integral hardwood flooring throughout the diaphragm: The code official is authorized to waive the requirement where it is shown that the condition occurs in areas small enough not to affect overall building performance.

Section ID: text-id-27439595-1

2.For all other diaphragms adequate strength shall be shown to be provided at locations where forces are transferred between the diaphragm and each new or strengthened vertical element of the seismic force-resisting system. Collector elements shall be provided where needed to distribute the transferred force over a greater length of diaphragm.

Section ID: text-id-27439595-2

Exception: Where the existing vertical elements of the seismic force-resisting system are shown to comply with this chapter, diaphragms need not be evaluated.

Section ID: text-id-27439595-3

Wood-framed shear walls shall have strength and stiffness sufficient to resist the seismic loads and shall conform to the requirements of this section. Where new sheathing is applied to existing studs to create new wood-framed shear walls, the new wall elements shall be considered bearing wall systems for purposes of determining seismic design parameters.

Section ID: text-id-27439597-0

Gypsum or cement plaster products shall not be used to provide the strength required by Section A403.3 or the stiffness required by Section A403.4.

Section ID: text-id-27439598-0

Wood structural panel shear walls shall meet the story drift limitation of Section A403.4. Conformance to the story drift limitation shall be determined by approved testing or calculation. Individual shear panels shall be permitted to exceed the maximum aspect ratio, provided that the allowable story drift and allowable shear capacities are not exceeded.

Section ID: text-id-27439601-0

Shear walls are permitted to be designed for continuity around openings in accordance with the building code. Blocking and steel strapping shall be provided at corners of the openings to transfer forces from discontinuous boundary elements into adjoining panel elements. Alternatively, perforated shear wall provisions of the building code are permitted to be used.

Section ID: text-id-27439603-0

Expansion anchors that provide tension strength by friction resistance shall not be used to connect hold-down devices to existing concrete or masonry elements.

Section ID: text-id-27439607-0

The required depth of embedment or edge distance for the anchor used in the hold-down connector shall be provided in the concrete or masonry below any plain concrete slab unless satisfactory evidence is submitted to the code official that shows that the concrete slab and footings are of monolithic construction.

Section ID: text-id-27439609-0

Steel retrofit systems shall have strength and stiffness sufficient to resist the seismic loads and shall conform to the requirements of this section.

Section ID: text-id-27439613-0

Steel special moment frames shall comply with all applicable provisions of AISC 341, except that Section E3.4a addressing strong-column/weak-beams of AISC 341, is not required for columns that carry no gravity load.

Section ID: text-id-27439614-0

Cantilevered column systems shall be permitted to be designed as inverted special, intermediate or ordinary moment frames, with corresponding moment frame seismic design coefficients, where the system satisfies the following conditions:

Section ID: text-id-27439616-0

1.The columns carry no gravity load.

Section ID: text-id-27439616-1

2.The columns are configured in pairs or larger groups connected by a continuous reinforced concrete foundation or grade beam.

Section ID: text-id-27439616-2

3.The foundation or grade beam shall be designed to resist the expected plastic moment at the base of each column, computed as RyFyZ in accordance with AISC 341.

Section ID: text-id-27439616-3

4.The flexibility of the foundation or grade beam, considering cracked section properties of the reinforced concrete, shall be included in computing the deformation of the steel frame system.

Section ID: text-id-27439616-4

5.The column height shall be taken as twice the actual height when checking lateral torsional buckling.

Section ID: text-id-27439616-5

These prescriptive measures shall apply only to two-story buildings and only where deemed appropriate by the code official. These prescriptive measures rely on rotation of the second floor diaphragm to distribute the seismic load between the side and rear walls around a ground floor open area. In the absence of an existing floor diaphragm of wood structural panel or diagonal sheathing at the top of the first story, a new wood structural panel diaphragm of minimum thickness of 3/4 inch (19.1 mm) and with 10d common nails at 6 inches (152 mm) on center shall be applied.

Section ID: text-id-27439621-0

To qualify for these prescriptive measures, the following additional conditions need to be satisfied by the retrofitted structure:

Section ID: text-id-27439622-0

1.Diaphragm aspect ratio L/W is less than 0.67, where W is the diaphragm dimension parallel to the soft, weak or open-front wall line and L is the distance in the orthogonal direction between that wall line and the rear wall of the ground floor open area.

Section ID: text-id-27439622-1

2.Minimum length of side shear walls = 20 feet (6096 mm).

Section ID: text-id-27439622-2

3.Minimum length of rear shear wall = three-fourths of the total rear wall length.

Section ID: text-id-27439622-3

4.Plan or vertical irregularities shall not be other than a soft, weak or open-front wall line.

Section ID: text-id-27439622-4

5.Roofing weight less than or equal to 5 pounds per square foot (240 N/m2).

Section ID: text-id-27439622-5

6.Aspect ratio of the full second floor diaphragm meets the requirements of the building code for new construction.

Section ID: text-id-27439622-6

The anchor size and spacing shall be not less than 3/4 inch (19.1 mm) in diameter at 32 inches (813 mm) on center. Where existing anchors are inadequate, supplemental or alternative approved connectors (such as new steel plates bolted to the side of the foundation and nailed to the sill) shall be used.

Section ID: text-id-27439626-0

Shear wall top plates shall be connected to blocking or rim joist at upper floor with not less than 18-gage galvanized steel angle clips 41/2 inches (114 mm) long with 12-8d nails spaced not farther than 16 inches (406 mm) on center, or by equivalent shear transfer methods.

Section ID: text-id-27439628-0

The shear wall sheathing shall be not less than 15/32-inch (11.9 mm), 5-ply Structural I with 10d nails at 4 inches (102 mm) on center at edges and 12 inches (305 mm) on center at field; blocked all edges with 3 by 4 board or larger. Where existing sill plates are less than 3-by thick, place flat 2-by on top of sill between studs, with flat 18-gage galvanized steel clips 41/2 inches (114 mm) long with 12-8d nails or 3/8-inch-diameter (9.5 mm) lags through blocking for shear transfer to sill plate. Stagger nailing from wall sheathing between existing sill and new blocking. Anchor new blocking to foundation as specified in this section.

Section ID: text-id-27439630-0

Shear walls shall be provided with hold-down anchors at each end. Two hold-down anchors are required at intersecting corners. Hold-downs shall be approved connectors with a minimum 5/8-inch-diameter (15.9 mm) threaded rod or other approved anchor with a minimum allowable load of 4,000 pounds (17.8 kN). Anchor embedment in concrete shall be not less than 5 inches (127 mm). Tie-rod systems shall be not less than 5/8 inch (15.9 mm) in diameter unless using high-strength cable. High-strength cable elongation shall not exceed 5/8 inch (15.9 mm) under a 4,000 pound (17.8 kN) axial load.

Section ID: text-id-27439632-0

New materials shall meet the requirements of the International Building Code, except where allowed by this chapter.

Section ID: text-id-27439637-0

The use of default values from the building code for continuous and isolated concrete spread footings shall be permitted. For soil that supports embedded vertical elements, Section A403.4.1 shall apply.

Section ID: text-id-27439639-0

The physical condition, strengths and stiffnesses of existing building materials shall be taken into account in any analysis required by this chapter. The verification of existing materials conditions and their conformance to these requirements shall be made by physical observation, material testing or record drawings as determined by the registered design professional subject to the approval of the code official.

Section ID: text-id-27439641-0

Where the required calculations rely on design values for common nails or surfaced dry lumber, their use in construction shall be verified by exposure.

Section ID: text-id-27439643-0

Where verification of the existing plywood is by use of record drawings alone, plywood shall be assumed to be of three plies.

Section ID: text-id-27439645-0

Wood framing is permitted to use the design stresses specified in the building code under which the building was constructed or other stress criteria approved by the code official.

Section ID: text-id-27439648-0

All existing structural steel shall be permitted to be assumed to comply with ASTM A36. Existing pipe or tube columns shall be assumed to be of minimum wall thickness unless verified by testing or exposure.

Section ID: text-id-27439650-0

All existing concrete footings shall be permitted to be assumed to be plain concrete with a compressive strength of 2,000 pounds per square inch (13.8 MPa). Existing concrete compressive strength taken greater than 2,000 pounds per square inch (13.8 MPa) shall be verified by testing, record drawings or department records.

Section ID: text-id-27439652-0

The analysis of existing cast-in-place anchors shall be permitted to assume proper anchor embedment for purposes of evaluating shear resistance to lateral loads.

Section ID: text-id-27439654-0

The plans shall show all information necessary for plan review and for construction and shall accurately reflect the design. The plans shall contain a note that states that this retrofit was designed in compliance with the criteria of this chapter.

Section ID: text-id-27439659-0

The plans shall show existing diaphragm and shear wall sheathing and framing materials; fastener type and spacing; diaphragm and shear wall connections; continuity ties; collector elements; and the portion of the existing materials that needs verification during construction. If the cap allowed by Section A403.3.1 is used to limit the scope of retrofit, the foregoing information shall be shown for each retrofitted story and at least one story above the uppermost retrofitted

story. If the cap allowed by Section A403.3.1 is not used, the foregoing information need only be shown for each retrofitted story and for the floor at the top of that story.

Section ID: text-id-27439661-0

The foundation plan shall include the size, type, location and spacing of all anchor bolts with the required depth of embedment, edge and end distance; the location and size of all shear walls and all columns for braced frames or moment frames; referenced details for the connection of shear walls, braced frames or moment-resisting frames to their footing; and referenced sections for any grade beams and footings.

Section ID: text-id-27439664-0

The framing plan shall include the length, location and material of shear walls; the location and material of frames; references or details for the column-to-beam connectors, beam-to-wall connections and shear transfers at floor and roof diaphragms; and the required nailing and length for wall top plate splices.

Section ID: text-id-27439666-0

Shear walls shall have a referenced schedule on the plans that includes the correct shear wall capacity in pounds per foot (N/m); the required fastener type, length, gage and head size; and a complete specification for the sheathing material and its thickness. The schedule shall also show the required location of 3-inch (76 mm) nominal or two 2-inch (51 mm) nominal edge members; the spacing of shear transfer elements such as framing anchors or added sill plate nails; the required hold-down with its bolt, screw or nail sizes; and the dimensions, lumber grade and species of the attached framing member.

Section ID: text-id-27439668-0

Notes shall show required edge distance for fasteners of structural wood panels and framing members; required flush nailing at the plywood surface; limits of mechanical penetrations; and the sill plate material assumed in the design. The limits of mechanical penetrations shall be detailed showing the maximum notching and drilled hole sizes.

Section ID: text-id-27439668-1

General notes shall show the requirements for material testing, special inspection and structural observation.

Section ID: text-id-27439670-0

Structural observation, in accordance with Section 1704.6 of the International Building Code is required, regardless of seismic design cate gory, height or other conditions. Structural observation shall include visual observation of work for conformance to the approved construction documents and confirmation of existing conditions assumed during design.

Section ID: text-id-27439675-0

Contractor responsibility shall be in accordance with Section 1704.4 of the International Building Code.

Section ID: text-id-27439677-0

Structural testing and inspection for new construction materials, submittals, reports and certificates of compliance shall be in accordance with Sections 1704 and 1705 of the International Building Code. Work done to comply with this chapter shall not be eligible for Exceptions 1, 2, or 3 of Section 1704.2 of the International Building Code or for the exception to Section 1705.13.2 of

the International Building Code.

Section ID: text-id-27439679-0

See Table A501.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that references the standard.

Section ID: text-id-27439685-0

TABLE A501.1

Section ID: text-id-27439686-0

REFERENCED STANDARDS

Section ID: text-id-27439686-1

User Note: User note:About this appendix: Chapter 11 of the International Building Code® contains provis

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

Section ID: text-id-27439756-0

User note:

Section ID: text-id-27439756-1

About this appendix: Chapter 11 of the International Building Code® contains provisions that set forth requirements for accessibility to buildings and their associated sites and facilities for people with physical disabilities. Sections 306 and 1508 in the code address accessibility provisions and alternatives permitted in existing buildings. Appendix B was added to address accessibility in construction for items that are not typically enforceable through the traditional building code enforcement process.

Section ID: text-id-27439756-2

Qualified historic buildings and facilities shall comply with Sections B101.2 through B101.5.

Section ID: text-id-27439758-0

These procedures shall apply to buildings and facilities designated as historic structures that undergo alterations or a change of occupancy.

Section ID: text-id-27439760-0

Where an alteration or change of occupancy is undertaken to a qualified historic building or facility that is subject to Section 106 of the National Historic Preservation Act, the federal agency with jurisdiction over the undertaking shall follow the Section 106 process. Where the state historic preservation officer or Advisory Council on Historic Preservation determines that compliance with the requirements for accessible routes, ramps, entrances, or toilet facilities would threaten or destroy the historic significance of the building or facility, the alternative requirements of Section 306.7.16 for that element are permitted.

Section ID: text-id-27439762-0

Where an alteration or change of occupancy is undertaken to a qualified historic building or facility that is not subject to Section 106 of the National Historic Preservation Act, and the entity undertaking the alterations believes that compliance with the requirements for accessible routes, ramps, entrances or toilet facilities would threaten or destroy the historic significance of the building or facility, the entity shall consult with the state historic preservation officer. Where the state historic preservation officer determines that compliance with the accessibility requirements for accessible routes, ramps, entrances or toilet facilities would threaten or destroy the historical significance of the building or facility, the alternative requirements of Section 306.7.16 for that element are permitted.

Section ID: text-id-27439764-0

Interested persons shall be invited to participate in the consultation process, including state or local accessibility officials, individuals with disabilities, and organizations representing individuals with disabilities.

Section ID: text-id-27439765-0

Where the state historic preservation officer has delegated the consultation responsibility for purposes of this section to a local government historic preservation program that has been certified in accordance with Section 101 of the National Historic Preservation Act of 1966 [(16 U.S.C. 470a(c)] and implementing regulations (36 CFR 61.5), the responsibility shall be permitted to be carried out by the appropriate local government body or official.

Section ID: text-id-27439767-0

In qualified historic buildings and facilities where alternative requirements of Section 306.7.16 are permitted, displays and written information shall be located where they can be seen by a seated person. Exhibits and signs displayed horizontally shall be 44 inches (1120 mm) maximum above the floor.

Section ID: text-id-27439770-0

Existing fixed transportation facilities and stations shall comply with Section B102.2.

Section ID: text-id-27439774-0

Rapid rail, light rail, commuter rail, intercity rail, high-speed rail and other fixed guideway systems, altered stations, and intercity rail and key stations, as defined under criteria established by the Department of Transportation in Subpart C of 49 CFR Part 37, shall comply with Sections B102.2.1 through B102.2.3.

Section ID: text-id-27439776-0

One accessible route, or more, from an accessible entrance to those areas necessary for use of the transportation system shall be provided. The accessible route shall include the features specified in Section E109.2 of the International Building Code, except that escalators shall comply with Section 3004.2.2 of the International Building Code. Where technical unfeasibility in existing stations requires the accessible route to lead from the public way to a paid area of the transit system, an accessible fare collection machine complying with Section E109.2.3 of the International Building Code shall be provided along such accessible route.

Section ID: text-id-27439777-0

Station platforms shall be positioned to coordinate with vehicles in accordance with applicable provisions of 36 CFR Part 1192. Low-level platforms shall be 8 inches (250 mm) minimum above top of rail.

Section ID: text-id-27439779-0

Exception: Where vehicles are boarded from sidewalks or street-level, low-level platforms shall be permitted to be less than 8 inches (250 mm).

Section ID: text-id-27439779-1

New direct connections to commercial, retail or residential facilities shall, to the maximum extent feasible, have an accessible route complying with Section 306.7.1 from the point of connection to boarding platforms and transportation system elements used by the public. Any elements provided to facilitate future direct connections shall be on an accessible route connecting boarding platforms and transportation system elements used by the public.

Section ID: text-id-27439781-0

Where dwelling units and sleeping units are altered or added, the requirements of Section E104.2 of the International Building Code shall apply only to the units being altered or added until the number of units with accessible communication features complies with the minimum number

required for new construction.

Section ID: text-id-27439786-0

See Table B104.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

Section ID: text-id-27439790-0

[BE] TABLE B104.1

Section ID: text-id-27439791-0

REFERENCED STANDARDS

Section ID: text-id-27439791-1

CHAPTER C1 GABLE END RETROFIT FOR HIGH-WIND AREAS

Section ID: text-id-27439813 | Section Number: 27439813

User Note: User note:About this appendix: Appendix C is intended to provide guidance for retrofitting exis

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

Section ID: text-id-27439813-0

User note:

Section ID: text-id-27439813-1

About this appendix: Appendix C is intended to provide guidance for retrofitting existing structures to strengthen their resistance to wind forces. This appendix is similar in scope to Appendix A, which addresses seismic retrofits for existing buildings, except that the subject matter is related to wind retrofits. These retrofits are voluntary measures that serve to better protect the public and reduce damage from high-wind events for existing buildings.

Section ID: text-id-27439813-2

The purpose of this appendix is to provide prescriptive alternatives for addressing retrofit of buildings in high-wind areas. Currently there are two chapters that deal with the retrofit of gable ends and the fastening of roof decks, Appendix Chapters C1 and C2, respectively.

Section ID: text-id-27439813-3

This chapter provides prescriptive methods for partial structural retrofit of an existing building to increase its resistance to out-of-plane wind loads. It is intended for voluntary use and for reference by mitigation programs. The provisions of this chapter do not necessarily satisfy requirements for new construction. Unless specifically cited, the provisions of this chapter do not necessarily satisfy requirements for structural improvements triggered by addition, alteration, repair, change of occupancy, building relocation or other circumstances.

Section ID: text-id-27439815-0

The provisions of this chapter are applicable only to buildings that meet the following eligibility requirements:

Section ID: text-id-27439817-0

1.The building is not more than three stories tall, from adjacent grade to the bottom plate of each gable end wall being retrofitted with this chapter.

Section ID: text-id-27439817-1

2.The building is classified as Occupancy Group R3 or is within the scope of the International Residential Code.

Section ID: text-id-27439817-2

3.The structure includes one or more wood-framed gable end walls, either conventionally framed or metal-plate-connected.

Section ID: text-id-27439817-3

In addition, the provisions of this chapter are applicable only to gable end walls that meet the following eligibility requirements:

Section ID: text-id-27439817-4

4.Each gable end wall has or shall be provided with studs or vertical webs spaced 24 inches (610 mm) on center maximum.

Section ID: text-id-27439817-5

5.Each gable end wall has a maximum height of 16 feet (4877 mm).

Section ID: text-id-27439817-6

Eligible gable end walls in eligible buildings may be retrofitted in accordance with this chapter. Other modifications required for compliance with this chapter shall be designed and constructed in accordance with the International Building Code or International Residential Code provisions for new construction, except as specifically provided for by this chapter.

Section ID: text-id-27439819-0

The following words and terms shall, for the purposes of this chapter, have the meanings shown herein.

Section ID: text-id-27439823-0

[BS] ANCHOR BLOCK. A piece of lumber secured to horizontal braces and filling the gap between existing framing members for the purpose of restraining horizontal braces from movement perpendicular to the framing members.

Section ID: text-id-27439823-1

[BS] COMPRESSION BLOCK. A piece of lumber used to restrain in the compression mode (force directed toward the interior of the attic) an existing or retrofit stud. It is attached to a horizontal brace and bears directly against the existing or retrofit stud.

Section ID: text-id-27439823-2

[BS] CONVENTIONALLY FRAMED GABLE END. A gable end framed with studs whose faces are perpendicular to the gable end wall.

Section ID: text-id-27439823-3

[BS] GABLE END FRAME. A factory or site-fabricated frame, installed as a complete assembly that incorporates vertical webs with their faces parallel to the plane of the frame.

Section ID: text-id-27439823-4

[BS] HORIZONTAL BRACE. A piece of lumber used to restrain both compression and tension loads applied by a retrofit stud. It is typically installed horizontally on the top of attic floor framing members (truss bottom chords or ceiling joists) or on the bottom of pitched roof framing members (truss top chord or rafters).

Section ID: text-id-27439823-5

[BS] HURRICANE TIES. Manufactured metal connectors designed to provide uplift and lateral restraint for roof framing members.

Section ID: text-id-27439823-6

[BS] NAIL PLATE. A manufactured metal plate made of galvanized steel with factory-punched holes for fasteners. A nail plate may have the geometry of a strap.

Section ID: text-id-27439823-7

[BS] RETROFIT. The voluntary process of strengthening or improving buildings or structures, or individual components of buildings or structures for the purpose of making existing conditions better serve the purpose for which they were originally intended or the purpose that current building codes intend.

Section ID: text-id-27439823-8

[BS] RETROFIT STUD. A lumber member used to structurally supplement an existing gable end wall stud or gable end frame web.

Section ID: text-id-27439823-9

[BS] STUD-TO-PLATE CONNECTOR. A manufactured metal connector designed to connect studs to plates.

Section ID: text-id-27439823-10

Existing wood materials that will be part of the retrofitting work (such as trusses, rafters, ceiling joists, top plates and wall studs) shall be in sound condition and free from defects or damage that substantially reduces the load-carrying capacity of the member. Any wood materials found to be damaged or deteriorated shall be strengthened or replaced with new materials to provide a net dimension of sound wood equivalent to its undamaged original dimensions.

Section ID: text-id-27439827-0

All new materials shall comply with the standards for those materials as specified in the International Building Code or the International Residential Code.

Section ID: text-id-27439829-0

Materials for retrofitting gable end walls shall comply with Table C103.3.

Section ID: text-id-27439831-0

[BS] TABLE C103.3

Section ID: text-id-27439832-0

MATERIAL SPECIFICATIONS FOR RETROFITSa

Section ID: text-id-27439832-1

For SI: 1 pound = 4.4 N.

Section ID: text-id-27439862-0

NA = Not Applicable.

Section ID: text-id-27439862-1

a.Metal plate connectors, nail plates, stud-to-plate connectors, straps and anchors shall be products approved for connecting wood-to-wood or wood-to-concrete as appropriate.

Section ID: text-id-27439862-2

Straps shall be permitted to be twisted or bent where they transition between framing members or connection points. Straps shall be bent only once at a given location though it is permissible that they be bent or twisted at multiple locations along their length.

Section ID: text-id-27439864-0

Fasteners shall meet the requirements of Table C103.5, Sections C103.5.1 and C103.5.2, and shall be permitted to be screws or nails meeting the minimum length requirement shown in the figures and specified in the tables of this appendix. Fastener spacing shall meet the requirements of Section C103.5.3.

Section ID: text-id-27439866-0

[BS] TABLE C103.5

Section ID: text-id-27439867-0

NAIL AND SCREW REQUIREMENTS

Section ID: text-id-27439867-1

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27439885-0

NA = Not Applicable.

Section ID: text-id-27439885-1

Unless otherwise indicated in the appendix, screw sizes and lengths shall be in accordance with Table C103.5. Permissible screws include deck screws and wood screws. Screws shall have not less than 1 inch (25 mm) of thread. Fine threaded screws or drywall screws shall not be permitted. Select the largest possible diameter screw such that the shank adjacent to the head fits through the hole in the strap.

Section ID: text-id-27439886-0

Unless otherwise indicated in this appendix, nail sizes and lengths shall be in accordance with Table C103.5.

Section ID: text-id-27439888-0

Fastener spacing for shear connections of lumber-to-lumber shall meet the requirements shown in Figure C103.5.3 and the following conditions.

Section ID: text-id-27439890-0

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27439893-0

[BS] FIGURE C103.5.3

Section ID: text-id-27439893-1

FASTENER SPACINGS FOR LUMBER-TO-LUMBER CONNECTIONS OPERATING IN SHEAR PARALLEL TO GRAIN

Section ID: text-id-27439893-2

Fastener spacing shall meet the following conditions except as provided for in Section C103.5.3.

Section ID: text-id-27439894-0

The distance between fasteners and the edge of lumber that is less than 31/2 inches deep (89 mm) in the direction of the fastener length shall be not less than 3/4 inch (19.1 mm).

Section ID: text-id-27439894-1

1.The distance between fasteners and the edge of lumber that is more than 2 inches (51 mm) thick in the direction of the fastener length shall be not less than 1/2 inch (12.7 mm).

Section ID: text-id-27439894-2

2.The distance between a fastener and the end of lumber shall be not less than 21/2 inches (64 mm).

Section ID: text-id-27439894-3

3.The distance between fasteners parallel to the grain (center-to-center) shall be not less than 21/2 inches (64 mm).

Section ID: text-id-27439894-4

4.The distance between fasteners perpendicular to the grain (center-to-center) in lumber that is less than 31/2 inches (89 mm) deep in the direction of the fastener length shall be 1 inch (25 mm).

Section ID: text-id-27439894-5

5.The distance between fasteners perpendicular to the grain (center-to-center) in lumber that is more than 2 inches (51 mm) thick in the direction of the fastener length shall be 1/2 inch (12.7 mm).

Section ID: text-id-27439894-6

Wood-to-wood connections fastener spacing shall meet the following conditions.

Section ID: text-id-27439896-0

1.The distance between fasteners parallel to grain (center-to-center) shall be not less than 21/2 inches (64 mm).

Section ID: text-id-27439896-1

2.The distance between fasteners across grain (center-to-center) shall be not less than 1 inch (25 mm).

Section ID: text-id-27439896-2

3.For wood-to-wood connections of lumber at right angles, fasteners shall be spaced not less than 21/2 inches (64 mm) parallel to the grain and 1 inch (25 mm) perpendicular to the grain in any direction.

Section ID: text-id-27439896-3

Metal connectors for wood-to-wood connections shall meet the following conditions.

Section ID: text-id-27439898-0

1.Fastener spacing to edge or ends of lumber shall be as dictated by the prefabricated holes in the connectors and the connectors shall be installed in a configuration that is similar to that shown by the connector manufacturer.

Section ID: text-id-27439898-1

2.Fasteners in 11/4-inch-wide (32 mm) metal straps that are installed on the narrow face of lumber shall be a minimum 1/4 inch (6.4 mm) from either edge of the lumber. Consistent with Section C103.5.3.1, fasteners shall be permitted to be spaced according to the fastener holes fabricated into the strap.

Section ID: text-id-27439898-2

3.Fasteners in metal nail plates shall be spaced not less than 1/2 inch (12.7 mm) perpendicular to grain and not less than 11/2 inches (38 mm) parallel to grain.

Section ID: text-id-27439898-3

These prescriptive methods of retrofitting are intended to increase the resistance of existing gable end construction for out-of-plane wind loads resulting from high-wind events. The ceiling diaphragm shall be comprised of minimum 1/2-inch-thick (12.7 mm) gypsum board, minimum nominal 3/8-inch-thick (9.5 mm) wood structural panels, or plaster. An overview isometric drawing of one type of gable end retrofit to improve wind resistance is shown in Figure C104.1.

Section ID: text-id-27439904-0

[BS] FIGURE C104.1

Section ID: text-id-27439907-0

BASIC GABLE END RETROFIT METHODOLOGY

Section ID: text-id-27439907-1

Horizontal braces shall be installed perpendicular to the roof and ceiling framing members at the location of each existing gable end stud greater than 3 feet (91 cm) in length. Unless it is adjacent to an omitted horizontal brace location, horizontal braces shall be minimum 2-inch by 4-inch (38 mm by 89 mm) dimensional lumber as defined in Section C103.3. A single horizontal brace is required at the top and bottom of each gable end stud for Retrofit Configuration A, B, or C. Two horizontal braces are required at the top and bottom of each gable end stud for Retrofit Configuration D. Maximum heights of gable end wall studs and associated retrofit studs for each Retrofit Configuration shall not exceed the values listed in Table C104.2. Horizontal braces shall be oriented with their wide faces across the roof or ceiling framing members, be fastened to not fewer than three framing members, and extend not less than 6 feet (183 cm) measured perpendicularly from the gable end plus 21/2 inches (64 mm) beyond the last top chord or bottom chord member (rafter or ceiling joist) from the gable end as shown in Figures C104.2(1), C104.2(2), C104.2(3) and C104.2(4).

Section ID: text-id-27439909-0

[BS] TABLE C104.2

Section ID: text-id-27439910-0

STUD LENGTH LIMITATIONS BASED ON EXPOSURE AND DESIGN WIND SPEED

Section ID: text-id-27439910-1

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Section ID: text-id-27439981-0

NR = Not Required.

Section ID: text-id-27439981-1

a.Interpolation between given wind speeds is not permitted.

Section ID: text-id-27439981-2

b.Existing gable end studs less than or equal to 3 feet 0 inches in height shall not require retrofitting.

Section ID: text-id-27439981-3

c.Configuration C is acceptable to 16 feet 0 inches maximum height.

Section ID: text-id-27439981-4

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27439984-0

[BS] FIGURE C104.2(1)

Section ID: text-id-27439984-1

TRUSS FRAMED GABLE END

Section ID: text-id-27439984-2

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27439987-0

[BS] FIGURE C104.2(2)

Section ID: text-id-27439987-1

CONVENTIONALLY FRAMED GABLE END L-BENT STRAP

Section ID: text-id-27439987-2

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27439990-0

[BS] FIGURE C104.2(3)

Section ID: text-id-27439990-1

TRUSS FRAMED GABLE END U-BENT STRAP

Section ID: text-id-27439990-2

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27439993-0

[BS] FIGURE C104.2(4)

Section ID: text-id-27439993-1

CONVENTIONALLY FRAMED GABLE END U-BENT STRAP

Section ID: text-id-27439993-2

If the spacing of existing vertical gable end studs is greater than 24 inches (64 mm), a new stud and corresponding horizontal braces shall be installed such that the maximum spacing between existing and added studs shall be not greater than 24 inches (64 mm). Additional gable end wall studs shall not be required at locations where their length would be 3 feet (914 mm) or less. Each end of each required new stud shall be attached to the existing roofing framing members (truss

top chord or rafter and truss bottom chord or ceiling joist) using not fewer than two 3-inch (76 mm) toenail fasteners (#8 wood screws or 10d nails) and a metal connector with minimum uplift capacity of 175 pounds (778 N), or nail plates with not fewer than four 11/4-inch-long (32 mm) fasteners (No. 8 wood screws or 8d nails).

Section ID: text-id-27439994-0

Each horizontal brace shall be fastened to each existing roof or ceiling member that it crosses using three 3-inch-long (76 mm) fasteners (No. 8 wood screws or 10d nails) as indicated in Figure C104.2(1) and Figure C104.2(3) for trusses and Figure C104.2(2) and Figure C104.2(4) for conventionally framed gable end walls. Alternative methods for providing horizontal bracing of the gable end studs as provided in Sections C104.2.3 through C104.2.9 shall be permitted.

Section ID: text-id-27439996-0

Where conditions exist that prevent installation in accordance with Section C104.2.2, horizontal braces shall be permitted to be omitted for height limitations corresponding to Retrofit Configurations A and B as defined in Table C104.2 provided that installation is as indicated in Figure C104.2.3 and provided that all of the following conditions are met. This method is not permitted for Retrofit Configurations C or D.

Section ID: text-id-27439998-0

1.There shall be not fewer than two horizontal braces on each side of an omitted horizontal brace or not fewer than one horizontal brace if it is the end horizontal brace. Omitted horizontal braces must be separated by not fewer than two horizontal braces even if that location is composed of two retrofit studs and two horizontal braces.

Section ID: text-id-27439998-1

2.Horizontal braces adjacent to the omitted horizontal brace shall be 2-inch by 6-inch (38 mm by 140 mm) lumber, shall butt against the existing studs, and shall be fastened to each existing roof or ceiling member crossed using three 3-inch-long (76 mm) fasteners (No. 8 wood screws or 10d nails). For Retrofit Configuration B, four fasteners shall be required on not fewer than one of the connections between the horizontal brace and the existing roof and ceiling framing members. Fasteners shall be spaced a not less than 3/4 inch (19.1 mm) from the edges of the horizontal braces and not less than 13/4 inches (44 mm) from adjacent fasteners.

Section ID: text-id-27439998-2

3.Where the existing studs on each side of an omitted horizontal brace have their wide face perpendicular to the gable end wall, the retrofit studs at those locations and the retrofit stud at the omitted horizontal brace locations shall extend not less than 33/4 inches (95 mm) beyond the interior edge of the existing studs for both Retrofit Configurations A and B. The edges of the three retrofit studs facing towards the interior of the attic shall be aligned such that they are the same distance from the gable end wall.

Section ID: text-id-27439998-3

4.Retrofit studs shall be fastened to existing studs in accordance with Section C104.3.

Section ID: text-id-27439998-4

5.Retrofit studs adjacent to the omitted horizontal brace shall be fastened to the horizontal brace using straps in accordance with Table C104.4.1 consistent with the size of the retrofit stud. The method applicable to Table C104.4.2 is not permitted.

Section ID: text-id-27439998-5

6.A strong back made of minimum of 2-inch by 8-inch (38 mm by 184 mm) nominal lumber shall be placed parallel to the gable end and shall be located on and span between horizontal braces on the two sides of the omitted horizontal brace and shall extend beyond each horizontal brace by not less than 21/2 inches (64 mm). The strong back shall be butted to the three retrofit studs. The strong back shall be attached to each of the horizontal braces on which it rests with five 3-inch-long (76 mm) fasteners (#8 screws or 8d nails). The fasteners shall have a minimum 3/4-inch (19.1 mm) edge distance and a minimum 21/2-inch (64 mm) spacing between fasteners. Additional compression blocks shall not be required at locations where a strong back butts against a retrofit stud.

Section ID: text-id-27439998-6

7.The retrofit stud at the location of the omitted horizontal braces shall be fastened to the strong back using a connector with minimum uplift capacity of 800 pounds (3559 N) and installed such that this capacity is oriented in the direction perpendicular to the gable end wall.

Section ID: text-id-27439998-7

8.The use of shortened horizontal braces using the alternative method of Section C104.2.5 is not permitted for horizontal braces adjacent to the omitted horizontal braces.

Section ID: text-id-27439998-8

9.Horizontal braces shall be permitted to be interrupted in accordance with Section C104.2.8.

Section ID: text-id-27439998-9

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27440001-0

[BS] FIGURE C104.2.3

Section ID: text-id-27440001-1

OMITTED HORIZONTAL BRACE

Section ID: text-id-27440001-2

Where conditions exist that prevent installation in accordance with Section C104.2.2 or C104.2.3, then retrofit studs and horizontal braces shall be permitted to be omitted from those locations by installation of ladder assemblies for Retrofit Configurations A and B as defined in Table C104.2 provided that all of the following conditions are met. This method is not permitted for Retrofit Configurations C or D.

Section ID: text-id-27440003-0

1.Not more than two ladder assemblies are permitted on a single gable end.

Section ID: text-id-27440003-1

2.There shall be not fewer than two retrofit studs and horizontal brace assemblies on either side of the locations where the retrofit studs and horizontal bracing members are omitted (two ladder braces shall not bear on a single retrofit stud).

Section ID: text-id-27440003-2

3.Where the existing studs on each side of an omitted horizontal brace have their wide face parallel to the gable end wall the retrofit studs at those locations and the retrofit stud at the omitted horizontal brace locations shall be 2-inch by 6-inch (38 mm by 180 mm) nominal lumber for Retrofit Configuration A and 2-inch by 8-inch (38 mm by 184 mm) lumber for Retrofit Configuration B.

Section ID: text-id-27440003-3

4.Horizontal braces adjacent to the omitted horizontal brace shall be 2-inch by 6-inch (38 mm by 180 mm) nominal lumber and be fastened to each existing roof or ceiling member crossed using three 3-inchlong (76 mm) fasteners (#8 wood screws or 10d nails) as indicated in Figures C104.2(1) and C104.2(3) for gable end frames and Figures C104.2(2) and C104.2(4) for conventionally framed gable end walls. For Retrofit Configuration B, four fasteners shall be required on one of the connections between the horizontal brace and the existing roof and ceiling framing members.

Section ID: text-id-27440003-4

5.Ladder rungs shall be provided across the location of the omitted retrofit studs as indicated in Figure C104.2.4(1) for gable end frames and Figure C104.2.4(2) for conventionally framed gable end walls.

Section ID: text-id-27440003-5

6.Ladder rungs shall be minimum 2-inch by 4-inch (38 mm by 89 mm) lumber oriented with their wide face horizontal and spaced not greater than 16 inches (406 mm) on center vertically.

Section ID: text-id-27440003-6

7.Where ladder rungs cross wall framing members they shall be connected to the wall framing members with a metal connector with a minimum capacity of 175 pounds (778 N) in the direction perpendicular to the gable end wall.

Section ID: text-id-27440003-7

8.Notching of the ladder rungs shall not be permitted unless the net depth of the framing member is not less than 31/2 inches (89 mm).

Section ID: text-id-27440003-8

For SI: 1 inch = 25.4 mm, 1 pound = 4.4 N.

Section ID: text-id-27440006-0

[BS] FIGURE C104.2.4(1)

Section ID: text-id-27440006-1

LADDER BRACING FOR OMITTED RETROFIT STUD (GABLE END FRAME)

Section ID: text-id-27440006-2

For SI: 1 inch = 25.4 mm, 1 pound = 4.4 N.

Section ID: text-id-27440009-0

[BS] FIGURE C104.2.4(2)

Section ID: text-id-27440009-1

LADDER BRACING FOR OMITTED RETROFIT STUD (CONVENTIONALLY FRAMED GABLE END)

Section ID: text-id-27440009-2

Where conditions exist that prevent installation in accordance with Section C104.2.2, C104.2.3 or C104.2.4, the horizontal braces shall be permitted to be shortened provided that installation is as indicated in Figure C104.2.5 and all of the following conditions are met.

Section ID: text-id-27440011-0

1.The horizontal brace shall be installed across not fewer than two framing spaces, extend not less than 4 feet (1220 mm) from the gable end wall plus 21/2 inches (64 mm) beyond the farthest roof or ceiling framing member from the gable end, and be fastened to each existing framing member with three 3-inch-long (76 mm) fasteners (#8 wood screws or 10d nails).

Section ID: text-id-27440011-1

2.An anchor block shall be fastened to the side of the horizontal brace in the second framing space from the gable end wall as shown in Figure C104.2.5. The anchor block lumber shall have a minimum edge thickness of 11/2 inches (38 mm) and the depth shall be at a minimum the depth of the existing roof or ceiling framing member. Six 3-inch-long (76 mm) fasteners (#8 wood screws or 10d nails) shall be used to fasten the anchor block to the side of the horizontal brace.

Section ID: text-id-27440011-2

3.The anchor block shall extend into the space between the roof or ceiling framing members not less than one-half the depth of the existing-framing members at the location where the anchor block is installed. The anchor block shall be installed tightly between the existing framing members such that the gap at either end shall not exceed 1/8 inch (3.2 mm).

Section ID: text-id-27440011-3

4.The use of omitted horizontal braces using the method of Section C104.2.3 adjacent to a short horizontal brace as defined in this section is not permitted.

Section ID: text-id-27440011-4

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27440014-0

[BS] FIGURE C104.2.5

Section ID: text-id-27440014-1

ANCHOR BLOCK INSTALLATION

Section ID: text-id-27440014-2

Where existing conditions preclude installation of horizontal braces on truss top or bottom chords they shall be permitted to be installed on truss webs provided that all of the following conditions are met.

Section ID: text-id-27440016-0

1.Horizontal braces shall be installed as close to the top or bottom chords as practical without altering the truss or any of its components and not more than three times the depth of the truss member to which it would ordinarily be attached.

Section ID: text-id-27440016-1

2.A racking block, comprised of an anchor block meeting the definition of “Anchor block” in Section C102 or comprised of minimum 15/32-inch (12 mm) plywood or 7/16-inch (11.1 mm) oriented strand board (OSB), shall be fastened to the horizontal brace in the second framing space from the gable end wall. The racking block shall extend toward the roof or ceiling diaphragm so that the edge of the racking block closest to the diaphragm is within one-half the depth of the existing framing member from the diaphragm surface. The racking block shall be attached to horizontal braces using six fasteners (No. 8 wood screws or 10d nails) of sufficient length to provide 11/2 inches (38 mm) of penetration into the horizontal brace.

Section ID: text-id-27440016-2

3.Racking blocks shall be permitted to be fastened to any face or edge of horizontal braces between each web or truss vertical posts to which a horizontal brace is attached. Racking blocks shall be permitted to be on alternate sides of horizontal braces. Racking blocks shall be installed tightly between the lumber of truss members or truss plates such that the gap at either end shall be not greater than 1/8 inch (3.2 mm).

Section ID: text-id-27440016-3

Where conditions exist that limit or restrict installation of horizontal braces near the peak of the roof, ridge ties shall be added to provide support for the required horizontal brace. The top of additional ridge tie members shall be installed not greater than 16 inches (406 mm) below the existing ridge line or 4 inches (102 mm) below impediments. A minimum 2-inch by 4-inch (38 mm by 89 mm) nominal member shall be used for each ridge tie, and fastening shall consist of two 3-inch-long (76 mm) wood screws, four 3-inch-long (76 mm) 10d nails or two 31/2-inch-long (89 mm) 16d nails driven through and clinched at each top chord or web member intersected by the ridge tie as illustrated in Figure C104.2.7.

Section ID: text-id-27440018-0

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Section ID: text-id-27440021-0

[BS] FIGURE C104.2.7

Section ID: text-id-27440021-1

DETAIL OF RETROFIT TIE INSTALLATION

Section ID: text-id-27440021-2

Where conditions exist that prevent the installation of a continuous horizontal brace then horizontal braces shall be permitted to be interrupted using the methods shown in Figures C104.2.8(1), C104.2.8(2), and C104.2.8(3). For interruptions that occur in the attic framing space closest to the gable end, nine 3-inch (76 mm) fasteners shall be used to connect each section of the interrupted horizontal braces. For interruptions that occur in the second attic space from the gable end, six 3-inch (76 mm) fasteners shall be used to connect each section of the interrupted horizontal braces. For interruptions that occur in the attic framing space farthest from the gable end, three 3-inch (76 mm) fasteners shall be used to connect each section of the interrupted horizontal braces. Horizontal braces shall be continued far enough to allow connections to three existing roof framing members as shown in Figure C104.2.8(1), C104.2.8(2) or C104.2.8(3). Fasteners shall be spaced in accordance with Section C103.5.3. Horizontal braces shall be the same width and depth as required for an uninterrupted member.

Section ID: text-id-27440023-0

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27440026-0

[BS] FIGURE C104.2.8(1)

Section ID: text-id-27440026-1

SPLICED HORIZONTAL BRACES

Section ID: text-id-27440026-2

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27440029-0

[BS] FIGURE C104.2.8(2)

Section ID: text-id-27440029-1

SPLICED HORIZONTAL BRACES

Section ID: text-id-27440029-2

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27440032-0

[BS] FIGURE C104.2.8(3)

Section ID: text-id-27440032-1

SPLICED HORIZONTAL BRACES

Section ID: text-id-27440032-2

Piggyback gable end frames (gable end frames built in two sections one above the other) shall be permitted to be retrofitted if either of the following cases is true:

Section ID: text-id-27440034-0

1.The existing studs in both the upper gable end frames and the lower gable end frames to which wall sheathing, panel siding, or other wall covering are attached are sufficiently in line that retrofit studs can be installed and connections made between the two with retrofit stud(s).

Section ID: text-id-27440034-1

2.Existing studs in the upper frame are not sufficiently in line with the studs in the frame below and the existing studs in the upper frame are 3 feet (91 cm) or shorter.

Section ID: text-id-27440034-2

For Condition 1 both the lower stud and the upper stud shall be retrofitted using the methods of Section C104.2. For Condition 2 the retrofit stud shall be connected to the lower studs using the methods of Section C104.2 and be continuous from the bottom horizontal brace to the top horizontal brace. Connection is not required between the retrofit stud and the upper stud. In both conditions the bottom chord of the piggyback truss section shall be fastened to each retrofit stud using a connector with minimum axial capacity of 175 pounds (778 N).

Section ID: text-id-27440034-3

Retrofit studs shall be installed in accordance with Section C104.3.1 using one of the five methods of Sections C104.3.2, C104.3.3, C104.3.4, C104.3.5 or C104.3.6. Figure C104.3 shows these

methods of installation. For the Retrofit Configuration obtained from Table C104.2, the size of retrofit studs shall be as indicated in Table C104.4.1 or Table C104.4.2. Retrofit studs shall extend from the top of the lower horizontal brace to the bottom of the upper horizontal brace except that a maximum gap of 1/8 inch (3.2 mm) is permitted at the bottom and 1/2 inch (12.7 mm) at the top. Where wall sheathing, panel siding or other wall covering is fastened to a conventionally framed gable end, retrofit studs shall be applied in accordance with Section C104.2.1.

Section ID: text-id-27440037-0

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27440040-0

[BS] FIGURE C104.3

Section ID: text-id-27440040-1

METHOD OF INSTALLING RETROFIT STUDS

Section ID: text-id-27440040-2

Where nail plates are not used, retrofit studs shall be attached to existing studs using 3-inch (76 mm) fasteners at not greater than 6 inches (152 mm) on center but not closer than 21/2 inches (64 mm) on center with fasteners not closer to ends of members than 21/2 inches (64 mm).

Section ID: text-id-27440041-0

Retrofit studs shall be installed immediately adjacent to existing gable end wall studs as indicated in Figure C104.3(a). The retrofit studs shall overlap the edge or side of the existing stud by not less than 11/4 inches (32 mm). Fasteners shall be installed as specified in Section C104.3.1.

Section ID: text-id-27440043-0

Retrofit studs shall be installed against the face of existing studs as indicated in Figure C104.3(b) such that the faces overlap not less than 11/2 inches (38 mm) and the edge distance to fasteners is not less than 3/4 inch (19.1 mm). Fasteners shall be installed as specified in Section C104.3.1.

Section ID: text-id-27440045-0

Provided that all of the following fastening conditions are met, retrofit studs shall be permitted to be butted by their edge to existing studs with the addition of nail plates as indicated in Figure C104.3(c) and Figure C104.3.4.

Section ID: text-id-27440047-0

1.The narrow edge of retrofit studs shall be installed against the narrow or the wide face of existing studs.

Section ID: text-id-27440047-1

2.Not fewer than two nail plates shall be used.

Section ID: text-id-27440047-2

3.Fasteners used to secure nail plates to studs shall be a minimum 11/4 inches (32 mm) long (#8 wood screws or 8d nails).

Section ID: text-id-27440047-3

4.Fasteners placed in nail plates shall have a minimum end distance of 21/2 inches (64 mm) for both studs and a maximum end distance of 6 inches (152 mm) from the ends of the shorter stud.

Section ID: text-id-27440047-4

5.Fasteners shall have a minimum 1/2-inch (12.7 mm) edge distance. Fasteners shall be placed not greater than 11/2 inches (38 mm) from the abutting vertical edges of existing studs and retrofit studs.

Section ID: text-id-27440047-5

6.There shall be at least three fasteners through nail plates into all existing and retrofit studs to which the nail plate is attached.

Section ID: text-id-27440047-6

7.Nail plates with three fasteners onto a single existing or retrofit stud shall be spaced not greater than 15 inches (38 cm) on center.

Section ID: text-id-27440047-7

8.Nail plates with more than three fasteners onto a single existing or retrofit stud shall be spaced not greater than 20 inches (51 cm) on center.

Section ID: text-id-27440047-8

9.Fasteners used to secure nail plates shall be spaced vertically not less than 11/2 inches (38 mm) on center. Staggered fasteners used to secure nail plates shall be spaced horizontally not less than 1/2 inch (12.7 mm).

Section ID: text-id-27440047-9

For SI: 1 inch = 25.4 mm.

Section ID: text-id-27440050-0

[BS] FIGURE C104.3.4

Section ID: text-id-27440050-1

NAIL PLATE FASTENING

Section ID: text-id-27440050-2

Retrofit studs may be offset from existing studs by use of nail plates as shown in Figure C104.3(d) such that the vertical corner of a retrofit stud shall align with the vertical corner of an existing stud as indicated in Figure C104.3(d) and Figure C104.3.4, and the fastening conditions of Section C104.3.4 are met.

Section ID: text-id-27440052-0

Retrofit studs and existing studs shall be permitted to be connected using noncontinuous 2-inch by 4-inch (38 mm by 89 mm) nailers as indicated in Figure C104.3(e) provided that the following conditions are met.

Section ID: text-id-27440054-0

1.Both the existing stud and the retrofit stud shall be butted to nailers and both shall be fastened to the nailer with 3-inch-long (76 mm) fasteners (#8 wood screws or 8d nails). Fasteners connecting each stud to the nailer shall be a spaced 6 inches (152 mm) o.c.

Section ID: text-id-27440054-1

2.Fasteners into nailers from any direction shall be offset vertically by not less than 21/2 inches (64 mm).

Section ID: text-id-27440054-2

3.Fasteners into nailers shall be not less than 21/2 inches (64 mm) but not more than 6 inches (152 mm) from the end of the shorter of the existing stud and retrofit stud to which they are fastened.

Section ID: text-id-27440054-3

Retrofit studs may be reduced in depth by notching, tapering or other methods at any number of locations along their length provided that all of the following conditions are met:

Section ID: text-id-27440056-0

1.Retrofit studs to be reduced in depth shall be sized such that the remaining minimum depth of member at the location of the notch (including cross-cut kerfs) shall be not less than that required by Table C104.4.1 or Table C104.4.2.

Section ID: text-id-27440056-1

2.Reduced in-depth retrofit stud shall not be spliced within 12 inches (30 cm) of the location of notches. Splice members shall not be notched.

Section ID: text-id-27440056-2

3.The vertical extent of notches shall not exceed 12 inches (30 cm) as measured at the depth of location of reduced depth.

Section ID: text-id-27440056-3

4.A reduced in-depth retrofit stud member shall be fastened to the side of the existing gable end wall studs in accordance with Section C104.3.1. Two additional 3-inch (76 mm) fasteners (#8 wood screws or 10d nails) shall be installed on each side of notches in addition to those required by Section C104.3.1.

Section ID: text-id-27440056-4

Retrofit studs greater than 8 feet (244 cm) in height may be field spliced in accordance with Figure C104.3.8.

Section ID: text-id-27440058-0

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Section ID: text-id-27440061-0

[BS] FIGURE C104.3.8

Section ID: text-id-27440061-1

RETROFIT STUD SPLICES

Section ID: text-id-27440061-2

Connections between horizontal braces and retrofit studs shall comply with Section C104.4.1 or C104.4.2. Each retrofit stud shall be connected to the top and bottom horizontal brace members with a minimum 20-gage 11/4-inch-wide (32 mm) flat or coil metal strap with prepunched holes for fasteners. Straps shall be fastened with 11/4-inch-long (32 mm) fasteners (#8 wood screws or 8d nails) with the number of fasteners as indicated in Table C104.4.1 and Table C104.4.2. Fasteners shall be not closer to the end of lumber than 21/2 inches (64 mm).

Section ID: text-id-27440064-0

Retrofit studs shall be connected to horizontal braces or to strong backs in accordance with Figure C104.2(1), C104.2(2) or C104.2.3, and shall comply with the following conditions.

Section ID: text-id-27440065-0

1.A strap shall be applied to the edges of a retrofit stud nearest the gable end wall and to the face of horizontal braces using at each end of the strap the number of fasteners specified in Table C104.4.1. Straps shall be long enough so that each strap extends sufficient distance onto the vertical face of the retrofit stud that the fastener closest to the ends of the studs is not less than 21/2 inches (64 mm) from the end of the stud. Straps shall be permitted to be twisted to accommodate the transition between the tops of retrofit studs and horizontal bracings following roof pitches.

Section ID: text-id-27440065-1

2.Compression blocks shall be installed on the horizontal braces directly against either the existing vertical gable end wall stud or the retrofit stud. Figure C104.2(1) (trusses) and Figure C104.2(2) (conventionally framed) show the installation of the compression block against the existing vertical gable end wall stud with the strap from the retrofit stud running beside the compression block. Compression blocks shall be permitted to be placed over straps. Compression blocks shall be fastened to the horizontal braces with not fewer than the minimum number of 3-inch-long (76 mm) fasteners (#8 wood screws or 10d nails) specified in Table C104.4.1. End and edge distances for fasteners shall be in accordance with Section C103.5.3.

Section ID: text-id-27440065-2

[BS] TABLE C104.4.1

Section ID: text-id-27440066-0

ELEMENT SIZING AND SPACING FOR L-BENT RETROFIT METHOD

Section ID: text-id-27440066-1

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Section ID: text-id-27440094-0

Retrofit studs shall be connected to horizontal braces in accordance with Figure C104.2(3) or C104.2(4), shall be limited to Retrofit Configurations A and B as defined in Table C104.2, and shall comply with the following conditions.

Section ID: text-id-27440096-0

1.Straps of sufficient length to meet the requirements for the number of fasteners in accordance with Table C104.4.2 and meet the end distance requirements of Section C103.5.3 shall be shaped around retrofit studs and fastened to the edges of horizontal braces. Straps shall wrap the back edge of the retrofit stud snugly with a maximum gap of 1/4 inch (6.4 mm). Rounded bends of straps shall be permitted. One fastener shall be installed that connects each strap to the side of the associated retrofit stud.

Section ID: text-id-27440096-1

2.The horizontal brace shall butt snugly against the retrofit stud with a maximum gap of 1/4 inch (6.4 mm).

Section ID: text-id-27440096-2

3.Straps shall be permitted to be twisted to accommodate the transition between the tops of retrofit studs and horizontal braces that follow the roof pitch.

Section ID: text-id-27440096-3

[BS] TABLE C104.4.2

Section ID: text-id-27440097-0

ELEMENT SIZING AND SPACING FOR U-BENT RETROFIT METHOD

Section ID: text-id-27440097-1

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Section ID: text-id-27440120-0

The bottom chords or bottom members of wood-framed gable end walls shall be attached to the wall below using one of the methods prescribed in Section C104.5.1 or C104.5.2. The particular method chosen shall correspond to the framing system and type of wall construction encountered.

Section ID: text-id-27440123-0

The bottom chords of the gable end frame shall be attached to the wall below using gusset angles. Not fewer than two fasteners shall be installed into the bottom chord. The gusset angles shall be installed throughout the portion of the gable end where the gable end wall height is greater than 3 feet (91 cm) at the spacing specified in Table C104.5.1. Connection to the wall below shall be by one of the following methods:

Section ID: text-id-27440124-0

1.For a wood-frame wall below, not fewer than two fasteners shall be installed. The fasteners shall be of the same diameter and style specified by the gusset angle manufacturer and sufficient length to extend through the double top plate of the wall below.

Section ID: text-id-27440124-1

2.For a concrete or masonry wall below without a sill plate, the type and number of fasteners into the wall shall be consistent with the gusset angle manufacturer’s specifications for fasteners installed in concrete or masonry.

Section ID: text-id-27440124-2

3.For a concrete or masonry wall below with a 2x sill plate, the fasteners into the wall below shall be of the diameter and style specified by the gusset angle manufacturer for concrete or masonry connections; but, long enough to pass through the wood sill plate and provide the required embedment into the concrete or masonry below. Alternatively, the gusset angle can be anchored to the sill plate using four each 11/2-inch-long (38 mm) fasteners of the same type as specified by the gusset angle manufacturer for wood connections, provided that the sill plate is anchored to the wall on each side of the gusset angle by a 1/4-inch-diameter (6.4 mm) masonry screw with 23/4 inches (70 mm) of embedment into the concrete or masonry wall. A 1/4-inch (6.4 mm) washer shall be placed under the heads of the masonry screws.

Section ID: text-id-27440124-3

[BS] TABLE C104.5.1

Section ID: text-id-27440125-0

SPACING OF GUSSET ANGLES

Section ID: text-id-27440125-1

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

Section ID: text-id-27440160-0

Each stud in a conventionally framed gable end wall, throughout the length of the gable end wall where the wall height is greater than 3 feet (914 mm), shall be attached to the bottom or sill plate using a stud to plate connector with minimum uplift capacity of 175 pounds (778 N). The bottom or sill plate shall then be connected to the wall below using one of the following methods:

Section ID: text-id-27440162-0

1.For a wood frame wall below, the sill or bottom plate shall be connected to the top plate of the wall below using 1/4-inch-diameter (6.4 mm) lag bolt fasteners of sufficient length to penetrate the bottom plate of the upper gable end wall and extend through the bottom top plate of the wall below. A washer sized for the diameter of the lag bolt shall be placed under the head of each lag bolt. The fasteners shall be installed at the spacing indicated in Table C104.5.2.

Section ID: text-id-27440162-1

2.For a concrete or masonry wall below, the sill or bottom plate shall be connected to the concrete or masonry wall below using 1/4-inch-diameter (6.4 mm) concrete or masonry screws of sufficient length to provide 23/4 inches (70 mm) of embedment into the top of the concrete or masonry wall. A washer sized for the diameter of the lag bolt shall be placed under the head of each lag bolt. The fasteners shall be installed at the spacing indicated in Table C104.5.2.

Section ID: text-id-27440162-2

[BS] TABLE C104.5.2

Section ID: text-id-27440163-0

SPACING OF LAG OR MASONRY SCREWS USED TO CONNECT SILL PLATE OF GABLE END WALL TO TOP OF THE WALL BELOW

Section ID: text-id-27440163-1

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

Section ID: text-id-27440198-0

This chapter provides prescriptive methods for partial structural retrofit of an existing building to increase its resistance to wind loads. It is intended for voluntary use where the ultimate design wind speed, Vult, determined in accordance with Figure 1609.3(1) of the International Building Code exceeds 130 mph (58 m/s) and for reference by mitigation programs. The provisions of this chapter do not necessarily satisfy requirements for new construction. Unless specifically cited, the provisions of this chapter do not necessarily satisfy requirements for structural improvements triggered by addition, alteration, repair, change of occupancy, building relocation or other circumstances.

Section ID: text-id-27440205-0

The provisions of this chapter are applicable only to buildings that meet either of the following eligibility requirements:

Section ID: text-id-27440207-0

1.Buildings assigned to Risk Category I or II in accordance with Table 1604.5 of the International Building Code.

Section ID: text-id-27440207-1

2.Buildings within the scope of the International Residential Code.

Section ID: text-id-27440207-2

For one- and two-family dwellings, fastening shall be in accordance with Section C202.1.1 or C202.1.2 as appropriate for the existing construction. The diameter of 8d nails shall be not less than 0.131 inch (3 mm) and the length shall be not less than 21/4 inches (57 mm) to qualify for the provisions of this section for existing nails regardless of head shape or head diameter.

Section ID: text-id-27440211-0

Roof decking consisting of sawn lumber or wood planks up to 12 inches (30 cm) wide and secured with not fewer than two nails (minimum size 8d) to each roof framing member it crosses shall be deemed to be sufficiently connected. Sawn lumber or wood plank decking secured with smaller fasteners than 8d nails or with fewer than two nails (minimum size 8d) to each framing member it crosses shall be deemed sufficiently connected if fasteners are added such that two clipped head, round head or ring shank nails (minimum size 8d) are in place on each framing member the nail crosses.

Section ID: text-id-27440212-0

For roof decking consisting of wood structural panels, fasteners and spacings required in Table C202.1.2 shall be deemed to comply with the requirements of Section 706.3.

Section ID: text-id-27440214-0

Supplemental fasteners as required by Table C202.1.2 shall be 8d ring shank nails with round heads and the following minimum dimensions:

Section ID: text-id-27440214-1

1.0.113-inch-nominal (3 mm) shank diameter.

Section ID: text-id-27440214-2

2.Ring diameter not less than 0.012 inch (0.3 mm) greater than shank diameter.

Section ID: text-id-27440214-3

3.16 to 20 rings per inch.

Section ID: text-id-27440214-4

4.A minimum 0.280-inch (7 mm) full round head diameter.

Section ID: text-id-27440214-5

5.Ring shank to extend not less than 11/2 inches (38 mm) from the tip of the nail.

Section ID: text-id-27440214-6

6.Minimum 21/4-inch (57 mm) nail length.

Section ID: text-id-27440214-7

[BS] TABLE C202.1.2

Section ID: text-id-27440215-0

SUPPLEMENT FASTENERS AT PANEL EDGES AND INTERMEDIATE FRAMING

Section ID: text-id-27440215-1

For SI: 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 mile per hour = 0.447 m/s.

Section ID: text-id-27440247-0

a.Maximum spacing determined based on existing fasteners and supplemental fasteners.

Section ID: text-id-27440247-1

b.Maximum spacing determined based on supplemental fasteners only.

Section ID: text-id-27440247-2

c.Interior zone = sheathing that is not located within 4 feet of the perimeter edge of the roof or within 4 feet of each side of a ridge.

Section ID: text-id-27440247-3

d.Edge zone = sheathing that is located within 4 feet of the perimeter edge of the roof and within 4 feet of each side of a ridge.

Section ID: text-id-27440247-4

See Table C301.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

Section ID: text-id-27440254-0

[BS] TABLE C301.1

Section ID: text-id-27440255-0

REFERENCED STANDARDS

Section ID: text-id-27440255-1

User Note: User notes:About this appendix: Appendix D provides criteria for Board of Appeals members.

User notes:

Section ID: text-id-27440271-0

About this appendix: Appendix D provides criteria for Board of Appeals members. Also provided are procedures by which the Board of Appeals should conduct its business.

Section ID: text-id-27440271-1

Code development reminder: Code change proposals to this appendix will be considered by the Administrative Code Development Committee during the 2022 (Group B) Code Development Cycle.

Section ID: text-id-27440271-2

A board of appeals shall be established within the jurisdiction for the purpose of hearing applications for modification of the requirements of this code pursuant to the provisions of Section 112. The board shall be established and operated in accordance with this section, and shall be authorized to hear evidence from appellants and the code official pertaining to the application and intent of this code for the purpose of issuing orders pursuant to these provisions.

Section ID: text-id-27440273-0

Any person shall have the right to appeal a decision of the code official to the board. An application for appeal shall be based on a claim that the intent of this code or the rules legally adopted hereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an equally good or better form of construction is proposed. The application shall be filed on a form obtained from the code official within 20 days after the notice was served.

Section ID: text-id-27440275-0

The board shall not have authority to waive requirements of this code or interpret the administration of this code.

Section ID: text-id-27440276-0

Appeals of notice and orders, other than Imminent Danger notices, shall stay the enforcement of the notice and order until the appeal is heard by the board.

Section ID: text-id-27440278-0

The board shall consist of five voting members appointed by the chief appointing authority of the jurisdiction. Each member shall serve for [INSERT NUMBER OF YEARS] years or until a successor has been appointed. The board member’s terms shall be staggered at intervals, so as to provide continuity. The code official shall be an ex officio member of said board but shall not vote on any matter before the board.

Section ID: text-id-27440281-0

The board shall consist of five individuals, who are qualified by experience and training to pass on matters pertaining to building construction and are not employees of the jurisdiction.

Section ID: text-id-27440282-0

The chief appointing authority is authorized to appoint two alternate members who shall be called by the board chairperson to hear appeals during the absence or disqualification of a member.

Alternate members shall possess the qualifications required for board membership, and shall be appointed for the same term or until a successor has been appointed.

Section ID: text-id-27440284-0

Vacancies shall be filled for an unexpired term in the same manner in which original appointments are required to be made.

Section ID: text-id-27440286-0

The board shall annually select one of its members to serve as chairperson.

Section ID: text-id-27440288-0

The chief appointing authority shall designate a qualified clerk to serve as secretary to the board. The secretary shall file a detailed record of all proceedings, which shall set forth the reasons for the board's decision, the vote of each member, the absence of a member and any failure of a member to vote.

Section ID: text-id-27440290-0

A member with any personal, professional or financial interest in a matter before the board shall declare such interest and refrain from participating in discussions, deliberations and voting on such matters.

Section ID: text-id-27440292-0

Compensation of members shall be determined by law.

Section ID: text-id-27440294-0

A member shall be removed from the board prior to the end of their terms only for cause. Any member with continued absence from regular meeting of the board may be removed at the discretion of the chief appointing authority.

Section ID: text-id-27440296-0

The board shall establish policies and procedures necessary to carry out its duties consistent with the provisions of this code and applicable state law. The procedures shall not require compliance with strict rules of evidence, but shall mandate that only relevant information be presented.

Section ID: text-id-27440299-0

The board shall meet upon notice from the chairperson, within 10 days of the filing of an appeal or at stated periodic intervals.

Section ID: text-id-27440301-0

All hearings before the board shall be open to the public. The appellant, the appellant's representative, the code official and any person whose interests are affected shall be given an opportunity to be heard.

Section ID: text-id-27440302-0

Three members of the board shall constitute a quorum.

Section ID: text-id-27440304-0

When five members are not present to hear an appeal, either the appellant or the appellant's representative shall have the right to request a postponement of the hearing.

Section ID: text-id-27440306-0

The jurisdiction shall furnish legal counsel to the board to provide members with general legal advice concerning matters before them for consideration. Members shall be represented by legal counsel at the jurisdiction’s expense in all matters arising from service within the scope of their duties.

Section ID: text-id-27440309-0

The board shall only modify or reverse the decision of the code official by a concurring vote of three or more members.

Section ID: text-id-27440311-0

The decision of the board shall be by resolution. Every decision shall be promptly filed in writing in the office of the code official within three days and shall be open to the public for inspection. A certified copy shall be furnished to the appellant or the appellant’s representative and to the code official.

Section ID: text-id-27440312-0

The code official shall take immediate action in accordance with the decision of the board.

Section ID: text-id-27440314-0

Any person, whether or not a previous party of the appeal, shall have the right to apply to the appropriate court for a writ of certiorari to correct errors of law. Application for review shall be made in the manner and time required by law following the filing of the decision in the office of the chief administrative officer.

Section ID: text-id-27440317-0

CHAPTER 1 SCOPE AND ADMINISTRATION

Section ID: text-id-27436267 | Section Number: 27436267

User Note: User note:About this chapter: Chapter 1 establishes the limits of applicability of the code and c

User note:

Section ID: text-id-27436267-0

About this chapter: Chapter 1 establishes the limits of applicability of the code and describes how the code is to be applied and enforced. Chapter 1 is in two parts: Part 1—Scope and Administration (Sections 101–102) and Part 2—Administration and Enforcement (Sections 103–117). Section 101 identifies which buildings and structures come under its purview and references other I-Codes® as applicable.

Section ID: text-id-27436267-1

This code is intended to be adopted as a legally enforceable document, and it cannot be effective without adequate provisions for its administration and enforcement. The provisions of Chapter 1 establish the authority and duties of the code official appointed by the authority having jurisdiction and also establish the rights and privileges of the registered design professional, contractor and property owner.

Section ID: text-id-27436267-2

These regulations shall be known as the Existing Building Code of [NAME OF JURISDICTION], herein after referred to as “this code.”

Section ID: text-id-27436270-0

The provisions of this code shall apply to the repair, alteration, change of occupancy, addition to and relocation of existing buildings.

Section ID: text-id-27436272-0

Exception: Detached one- and two-family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress, and their accessory structures not more than three stories above grade plane in height, shall comply with this code or the International Residential Code.

Section ID: text-id-27436272-1

Where work regulated by this code is also regulated by the construction requirements for existing buildings in Chapter 11 of the International Fire Code, such work shall comply with applicable requirements in both codes.

Section ID: text-id-27436273-0

The intent of this code is to provide flexibility to permit the use of alternative approaches to achieve compliance with minimum requirements to provide a reasonable level of safety, health, property protection and general welfare insofar as they are affected by the repair, alteration, change of occupancy, addition and relocation of existing buildings.

Section ID: text-id-27436276-0

This code shall apply to the repair, alteration, change of occupancy, addition and relocation of existing buildings, regardless of occupancy, subject to the criteria of Sections 101.4.1 and 101.4.2.

Section ID: text-id-27436278-0

A building or portion of a building that has not been previously occupied or used for its intended purpose, in accordance with the laws in existence at the time of its completion, shall be permitted to comply with the provisions of the laws in existence at the time of its original permit unless such permit has expired. Subsequent permits shall comply with the International Building Code or International Residential Code, as applicable, for new construction.

Section ID: text-id-27436279-0

The legal occupancy of any building existing on the date of adoption of this code shall be permitted to continue without change, except as is specifically covered in this code, the International Fire Code, or the International Property Maintenance Code, or as is deemed necessary by the code official for the general safety and welfare of the occupants and the public.

Section ID: text-id-27436281-0

Construction work covered in this code, including any related demolition, shall comply with the requirements of Chapter 15.

Section ID: text-id-27436284-0

The code official is authorized to require retrofit of buildings, structures or individual structural members in accordance with the appendices of this code if such appendices have been individually adopted.

Section ID: text-id-27436286-0

Repairs or alterations mandated by any property, housing or fire safety maintenance code, or mandated by any licensing rule or ordinance adopted pursuant to law, shall conform only to the requirements of that code, rule or ordinance, and shall not be required to conform to this code unless the code requiring such repair or alteration so provides.

Section ID: text-id-27436288-0

Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall be applicable. Where, in any specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern.

Section ID: text-id-27436292-0

The provisions of this code shall not be deemed to nullify any provisions of local, state or federal law.

Section ID: text-id-27436294-0

References to chapter or section numbers or to provisions not specifically identified by number shall be construed to refer to such chapter, section or provision of this code.

Section ID: text-id-27436296-0

The codes and standards referenced in this code shall be considered part of the requirements of this code to the prescribed extent of each such reference and as further regulated in Sections

102.4.1 and 102.4.2.

Section ID: text-id-27436298-0

Exception: Where enforcement of a code provision would violate the conditions of the listing of the equipment or appliance, the conditions of the listing shall govern.

Section ID: text-id-27436298-1

Where conflicts occur between provisions of this code and referenced codes and standards, the provisions of this code shall apply.

Section ID: text-id-27436299-0

Where the extent of the reference to a referenced code or standard includes subject matter that is within the scope of this code, the provisions of this code, as applicable, shall take precedence over the provisions in the referenced code or standard.

Section ID: text-id-27436301-0

In the event that any part or provision of this code is held to be illegal or void, this shall not have the effect of making void or illegal any of the other parts or provisions.

Section ID: text-id-27436304-0

The [INSERT NAME OF DEPARTMENT] is hereby created, and the official in charge thereof shall be known as the code official. The function of the agency shall be the implementation, administration and enforcement of the provisions of this code.

Section ID: text-id-27436310-0

The code official shall be appointed by the chief appointing authority of the jurisdiction.

Section ID: text-id-27436312-0

In accordance with the prescribed procedures of this jurisdiction and with the concurrence of the appointing authority, the code official shall have the authority to appoint a deputy code official, other related technical officers, inspectors and other employees. Such employees shall have powers as delegated by the code official.

Section ID: text-id-27436314-0

The code official is hereby authorized and directed to enforce the provisions of this code. The code official shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of this code. Such policies and procedures shall not have the effect of waiving requirements specifically provided for in this code.

Section ID: text-id-27436318-0

The code official shall receive applications, review construction documents and issue permits for the repair, alteration, addition, demolition, change of occupancy and relocation of buildings; inspect the premises for which such permits have been issued; and enforce compliance with the provisions of this code.

Section ID: text-id-27436320-0

For applications for reconstruction, rehabilitation, repair, alteration, addition or other improvement of existing buildings or structures located in flood hazard areas, the building official shall determine where the proposed work constitutes substantial improvement or repair of substantial

damage. Where the building official determines that the proposed work constitutes substantial improvement or repair of substantial damage, and where required by this code, the building official shall require the building to meet the requirements of Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

Section ID: text-id-27436321-0

When requested by the permit applicant or the code official, the code official shall meet with the permit applicant prior to the application for a construction permit to discuss plans for the proposed work or change of occupancy in order to establish the specific applicability of the provisions of this code.

Section ID: text-id-27436323-0

Exception: Repairs and Level 1 alterations.

Section ID: text-id-27436323-1

The code official is authorized to require an existing building to be investigated and evaluated by a registered design professional based on the circumstances agreed on at the preliminary meeting. The design professional shall notify the code official if any potential noncompliance with the provisions of this code is identified.

Section ID: text-id-27436324-0

The code official shall issue necessary notices or orders to ensure compliance with this code.

Section ID: text-id-27436328-0

The code official shall make the required inspections, or the code official shall have the authority to accept reports of inspection by approved agencies or individuals. Reports of such inspections shall be in writing and be certified by a responsible officer of such approved agency or by the responsible individual. The code official is authorized to engage such expert opinion as deemed necessary to report on unusual technical issues that arise, subject to the approval of the appointing authority.

Section ID: text-id-27436330-0

The code official shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

Section ID: text-id-27436332-0

Where it is necessary to make an inspection to enforce the provisions of this code, or where the code official has reasonable cause to believe that there exists in a structure or on a premises a condition that is contrary to or in violation of this code that makes the structure or premises unsafe, dangerous or hazardous, the code official is authorized to enter the structure or premises at reasonable times to inspect or to perform the duties imposed by this code, provided that if such structure or premises be occupied that credentials be presented to the occupant and entry requested. If such structure or premises be unoccupied, the code official shall first make a reasonable effort to locate the owner, the owner’s authorized agent or other person having charge or control of the structure or premises and request entry. If entry is refused, the code official shall have recourse to the remedies provided by law to secure entry.

Section ID: text-id-27436334-0

The code official shall keep official records of applications received, permits and certificates issued, fees collected, reports of inspections, and notices and orders issued. Such records shall

be retained in the official records for the period required for retention of public records.

Section ID: text-id-27436336-0

The code official, member of the Board of Appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be rendered civilly or criminally liable personally and is hereby relieved from personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

Section ID: text-id-27436338-0

Any suit or criminal complaint instituted against an officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code shall be defended by legal representatives of the jurisdiction until the final termination of the proceedings. The code official or any subordinate shall not be liable for cost in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

Section ID: text-id-27436339-0

Materials, equipment and devices approved by the code official shall be constructed and installed in accordance with such approval.

Section ID: text-id-27436342-0

The use of used materials that meet the requirements of this code for new materials is permitted. Used equipment and devices shall be permitted to be reused subject to the approval of the code official.

Section ID: text-id-27436343-0

Wherever there are practical difficulties involved in carrying out the provisions of this code, the code official shall have the authority to grant modifications for individual cases on application of the owner or owner’s authorized representative, provided that the code official shall first find that special individual reason makes the strict letter of this code impractical, the modification is in compliance with the intent and purpose of this code and such modification does not lessen health, accessibility, life and fire safety, or structural requirements. The details of action granting modifications shall be recorded and entered in the files of the Department of Building Safety.

Section ID: text-id-27436346-0

For existing buildings located in flood hazard areas for which repairs, alterations and additions constitute substantial improvement, the code official shall not grant modifications to provisions related to flood resistance unless a determination is made that:

Section ID: text-id-27436347-0

1. The applicant has presented good and sufficient cause that the unique characteristics of the size, configuration or topography of the site render compliance with the flood-resistant construction provisions inappropriate.

Section ID: text-id-27436347-1

2. Failure to grant the modification would result in exceptional hardship.

Section ID: text-id-27436347-2

3. The granting of the modification will not result in increased flood heights, additional threats to public safety, extraordinary public expense nor create nuisances, cause fraud on or victimization of the public, or conflict with existing laws or ordinances.

Section ID: text-id-27436347-3

4. The modification is the minimum necessary to afford relief, considering the flood hazard.

Section ID: text-id-27436347-4

5. A written notice will be provided to the applicant specifying, if applicable, the difference between the design flood elevation and the elevation to which the building is to be built, stating that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation and that construction below the design flood elevation increases risks to life and property.

Section ID: text-id-27436347-5

The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the code official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Where the alternative material, design or method of construction is not approved, the code official shall respond in writing, stating the reasons why the alternative was not approved.

Section ID: text-id-27436350-0

Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from approved sources.

Section ID: text-id-27436351-0

Where there is insufficient evidence of compliance with the provisions of this code or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the code official shall have the authority to require tests as evidence of compliance to be made without expense to the jurisdiction. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the code official shall approve the testing procedures. Tests shall be performed by an approved agency. Reports of such tests shall be retained by the code official for the period required for retention.

Section ID: text-id-27436353-0

Any owner or owner’s authorized agent who intends to repair, add to, alter, relocate, demolish or change the occupancy of a building or to repair, install, add, alter, remove, convert or replace any electrical, gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be performed, shall first make application to the code official and obtain the required permit.

Section ID: text-id-27436358-0

Instead of an individual permit for each alteration to an already approved electrical, gas, mechanical, or plumbing installation, the code official is authorized to issue an annual permit on application therefor to any person, firm or corporation regularly employing one or more qualified trade persons in the building, structure, or on the premises owned or operated by the applicant for the permit.

Section ID: text-id-27436359-0

The person to whom an annual permit is issued shall keep a detailed record of alterations made under such annual permit. The code official shall have access to such records at all times, or such records shall be filed with the code official as designated.

Section ID: text-id-27436361-0

Exemptions from permit requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction. Permits shall not be required for the following:

Section ID: text-id-27436364-0

Building:

Section ID: text-id-27436364-1

1. Sidewalks and driveways not more than 30 inches(762 mm) above grade and not over any basement or story below and that are not part of an accessible route.

Section ID: text-id-27436364-2

2. Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.

Section ID: text-id-27436364-3

3. Temporary motion picture, television, and theater stage sets and scenery.

Section ID: text-id-27436364-4

4. Shade cloth structures constructed for nursery or agricultural purposes, and not including service systems.

Section ID: text-id-27436364-5

5. Window awnings supported by an exterior wall of Group R-3 or Group U occupancies.

Section ID: text-id-27436364-6

6. Nonfixed and movable cases, counters and partitions not over 5 feet 9 inches (1753 mm) in height.

Section ID: text-id-27436364-7

Electrical:

Section ID: text-id-27436364-8

1. Repairs and maintenance: Minor repair work, including the replacement of lamps or the connection of approved portable electrical equipment to approved permanently installed receptacles.

Section ID: text-id-27436364-9

2. Radio and television transmitting stations: The provisions of this code shall not apply to electrical equipment used for radio and television transmissions, but do apply to equipment and wiring for power supply, the installations of towers and antennas.

Section ID: text-id-27436364-10

3. Temporary testing systems: A permit shall not be required for the installation of any temporary system required for the testing or servicing of electrical equipment or apparatus.

Section ID: text-id-27436364-11

Gas:

Section ID: text-id-27436364-12

1. Portable heating appliance.

Section ID: text-id-27436364-13

2. Replacement of any minor part that does not alter approval of equipment or make such equipment unsafe.

Section ID: text-id-27436364-14

Mechanical:

Section ID: text-id-27436364-15

1. Portable heating appliance.

Section ID: text-id-27436364-16

2. Portable ventilation equipment.

Section ID: text-id-27436364-17

3. Portable cooling unit.

Section ID: text-id-27436364-18

4. Steam, hot or chilled water piping within any heating or cooling equipment regulated by this code.

Section ID: text-id-27436364-19

5. Replacement of any part that does not alter its approval or make it unsafe.

Section ID: text-id-27436364-20

6. Portable evaporative cooler.

Section ID: text-id-27436364-21

7. Self-contained refrigeration system containing 10 pounds (4.54 kg) or less of refrigerant and actuated by motors of 1 horsepower (746 W) or less.

Section ID: text-id-27436364-22

Plumbing:

Section ID: text-id-27436364-23

1. The stopping of leaks in drains, water, soil, waste or vent pipe; provided, however, that if any concealed trap, drainpipe, water, soil, waste or vent pipe becomes defective and it becomes

necessary to remove and replace the same with new material, such work shall be considered as new work, and a permit shall be obtained and inspection made as provided in this code.

Section ID: text-id-27436364-24

2. The clearing of stoppages or the repairing of leaks in pipes, valves or fixtures, and the removal and reinstallation of water closets, provided that such repairs do not involve or require the replacement or rearrangement of valves, pipes or fixtures.

Section ID: text-id-27436364-25

Where equipment replacements and repairs must be performed in an emergency situation, the permit application shall be submitted within the next working business day to the code official.

Section ID: text-id-27436365-0

Application or notice to the code official is not required for repairs to structures and items listed in Section 105.2 provided that such repairs do not include any of the following:

Section ID: text-id-27436367-0

1. The cutting away of any wall, partition or portion thereof.

Section ID: text-id-27436367-1

2. The removal or cutting of any structural beam or load-bearing support.

Section ID: text-id-27436367-2

3. The removal or change of any required means of egress or rearrangement of parts of a structure affecting the egress requirements.

Section ID: text-id-27436367-3

4. Any addition to, alteration of, replacement or relocation of any standpipe, water supply, sewer, drainage, drain leader, gas, soil, waste, vent or similar piping, or electric wiring.

Section ID: text-id-27436367-4

5. Mechanical or other work affecting public health or general safety.

Section ID: text-id-27436367-5

A permit shall not be required for the installation, alteration or repair of generation, transmission, distribution or metering, or other related equipment that is under the ownership and control of public service agencies by established right.

Section ID: text-id-27436369-0

To obtain a permit, the applicant shall first file an application therefor in writing on a form furnished by the Department of Building Safety for that purpose. Such application shall:

Section ID: text-id-27436372-0

1. Identify and describe the work in accordance with Chapter 3 to be covered by the permit for which application is made.

Section ID: text-id-27436372-1

2. Describe the land on which the proposed work is to be done by legal description, street address or similar description that will readily identify and definitely locate the proposed building or work.

Section ID: text-id-27436372-2

3. Indicate the use and occupancy for which the proposed work is intended.

Section ID: text-id-27436372-3

4. Be accompanied by construction documents and other information as required in Section 106.3.

Section ID: text-id-27436372-4

5. State the valuation of the proposed work.

Section ID: text-id-27436372-5

6. Be signed by the applicant or the applicant’s authorized agent.

Section ID: text-id-27436372-6

7. Give such other data and information as required by the code official.

Section ID: text-id-27436372-7

The code official shall examine or cause to be examined applications for permits and amendments thereto within a reasonable time after filing. If the application or the construction documents do not conform to the requirements of pertinent laws, the code official shall reject such application in writing, stating the reasons therefor. If the code official is satisfied that the proposed work conforms to the requirements of this code and laws and ordinances applicable thereto, the code official shall issue a permit therefor as soon as practicable.

Section ID: text-id-27436373-0

An application for a permit for any proposed work shall be deemed to have been abandoned 180 days after the date of filing, unless such application has been pursued in good faith or a permit has been issued; except that the code official is authorized to grant one or more extensions of time for additional periods not exceeding 90 days each. The extension shall be requested in writing and justifiable cause demonstrated.

Section ID: text-id-27436375-0

The issuance or granting of a permit shall not be construed to be a permit for, or an approval of, any violation of any of the provisions of this code or of any other ordinance of the jurisdiction. Permits presuming to give authority to violate or cancel the provisions of this code or other ordinances of the jurisdiction shall not be valid. The issuance of a permit based on construction documents and other data shall not prevent the code official from requiring the correction of errors in the construction documents and other data. The code official is authorized to prevent occupancy or use of a structure where in violation of this code or of any other ordinances of this jurisdiction.

Section ID: text-id-27436378-0

Every permit issued shall become invalid unless the work on the site authorized by such permit is commenced within 180 days after its issuance, or if the work authorized on the site by such permit is suspended or abandoned for a period of 180 days after the time the work is commenced. The code official is authorized to grant, in writing, one or more extensions of time for periods not more than 180 days each. The extension shall be requested in writing and justifiable cause demonstrated.

Section ID: text-id-27436380-0

The code official is authorized to suspend or revoke a permit issued under the provisions of this code wherever the permit is issued in error or on the basis of incorrect, inaccurate or incomplete information, or in violation of any ordinance or regulation or any of the provisions of this code.

Section ID: text-id-27436382-0

The building permit or copy shall be kept on the site of the work until the completion of the project.

Section ID: text-id-27436384-0

Submittal documents consisting of construction documents, special inspection and structural observation programs, investigation and evaluation reports, and other data shall be submitted in two or more sets, or in a digital format where allowed by the code official, with each application for a permit. The construction documents shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed. Where special conditions exist, the code official is authorized to require additional construction documents to be prepared by a registered design professional.

Section ID: text-id-27436388-0

Exception: The code official is authorized to waive the submission of construction documents and other data not required to be prepared by a registered design professional if it is found that the nature of the work applied for is such that reviewing of construction documents is not necessary to obtain compliance with this code.

Section ID: text-id-27436388-1

Construction documents shall be in accordance with Sections 106.2.1 through 106.2.6.

Section ID: text-id-27436390-0

Construction documents shall be dimensioned and drawn on suitable material. Electronic media documents are permitted to be submitted where approved by the code official. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the code official. The work areas shall be shown.

Section ID: text-id-27436391-0

Shop drawings for the fire protection system(s) shall be submitted to indicate compliance with this code and the construction documents and shall be approved prior to the start of system installation. Shop drawings shall contain information as required by the referenced installation standards in Chapter 9 of the International Building Code.

Section ID: text-id-27436393-0

The construction documents for Alterations—Level 2, Alterations—Level 3, additions and changes of occupancy shall show in sufficient detail the location, construction, size and character of all portions of the means of egress in compliance with the provisions of this code. The construction documents shall designate the number of occupants to be accommodated in every work area of every floor and in all affected rooms and spaces.

Section ID: text-id-27436395-0

Construction documents for work affecting the exterior wall envelope shall describe the exterior wall envelope in sufficient detail to determine compliance with this code. The construction documents shall provide details of the exterior wall envelope as required, including windows,

doors, flashing, intersections with dissimilar materials, corners, end details, control joints, intersections at roof, eaves or parapets, means of drainage, water-resistive barriers and details around openings.

Section ID: text-id-27436397-0

The construction documents shall include manufacturer’s installation instructions that provide supporting documentation that the proposed penetration and opening details described in the construction documents maintain the wind and weather resistance of the exterior wall envelope. The supporting documentation shall fully describe the exterior wall system that was tested, where applicable, as well as the test procedure used.

Section ID: text-id-27436397-1

Where the scope of work involves balconies or other elevated walking surfaces have weather-exposed surfaces, and the structural framing is protected by an impervious moisture barrier, the construction documents shall include details for all elements of the impervious moisture barrier system. The construction documents shall include manufacturer’s installation instructions.

Section ID: text-id-27436399-0

The construction documents submitted with the application for permit shall be accompanied by a site plan showing to scale the size and location of new construction and existing structures on the site, distances from lot lines, the established street grades, and the proposed finished grades; and it shall be drawn in accordance with an accurate boundary line survey. In the case of demolition, the site plan shall show construction to be demolished and the location and size of existing structures and construction that are to remain on the site or plot. Thecode official is authorized to waive or modify the requirement for a site plan where the application for permit is for alteration, repair or change of occupancy.

Section ID: text-id-27436401-0

The code official shall examine or cause to be examined the submittal documents and shall ascertain by such examinations whether the construction or occupancy indicated and described is in accordance with the requirements of this code and other pertinent laws or ordinances.

Section ID: text-id-27436404-0

Where the code official issues a permit, the construction documents shall be approved in writing or by stamp as “Reviewed for Code Compliance.” One set of construction documents so reviewed shall be retained by the code official. The other set shall be returned to the applicant, shall be kept at the site of work, and shall be open to inspection by the code official or a duly authorized representative.

Section ID: text-id-27436405-0

This code shall not require changes in the construction documents, construction or designated occupancy of a structure for which a lawful permit has been issued and the construction of which has been pursued in good faith within 180 days after the effective date of this code and has not been abandoned.

Section ID: text-id-27436407-0

The code official is authorized to issue a permit for the construction of foundations or any other part of a building before the construction documents for the whole building or structure have been

submitted, provided that adequate information and detailed statements have been filed complying with pertinent requirements of this code. The holder of such permit for the foundation or other parts of a building shall proceed at the holder’s own risk with the building operation and without assurance that a permit for the entire structure will be granted.

Section ID: text-id-27436409-0

Deferral of any submittal items shall have the prior approval of the code official. The registered design professional in responsible charge shall list the deferred submittals on the construction documents for review by the code official.

Section ID: text-id-27436411-0

Submittal documents for deferred submittal items shall be submitted to the registered design professional in responsible charge who shall review them and forward them to the code official with a notation indicating that the deferred submittal documents have been reviewed and that they have been found to be in general conformance to the design of the building. The deferred submittal items shall not be installed until their deferred submittal documents have been approved by the code official.

Section ID: text-id-27436411-1

Work shall be installed in accordance with the reviewed construction documents, and any changes made during construction that are not in compliance with the approved construction documents shall be resubmitted for approval as an amended set of construction documents.

Section ID: text-id-27436414-0

One set of approved construction documents shall be retained by the code official for a period of not less than the period required for retention of public records.

Section ID: text-id-27436416-0

Where it is required that documents be prepared by a registered design professional, the code official shall be authorized to require the owner or the owner’s authorized agent to engage and designate on the building permit application a registered design professional who shall act as the registered design professional in responsible charge. If the circumstances require, the owner or the owner’s authorized agent shall designate a substitute registered design professional in responsible charge who shall perform the duties required of the original registered design professional in responsible charge. The code official shall be notified in writing by the owner or the owner’s authorized agent if the registered design professional in responsible charge is changed or is unable to continue to perform the duties. The registered design professional in responsible charge shall be responsible for reviewing and coordinating submittal documents prepared by others, including phased and deferred submittal items, for compatibility with the design of the building. Where structural observation is required, the inspection program shall name the individual or firms who are to perform structural observation and describe the stages of construction at which structural observation is to occur.

Section ID: text-id-27436418-0

The code official is authorized to issue a permit for temporary uses. Such permits shall be limited as to time of service but shall not be permitted for more than 180 days. The code official is authorized to grant extensions for demonstrated cause.

Section ID: text-id-27436422-0

Temporary uses shall conform to the structural strength, fire safety, means of egress, accessibility, light, ventilation and sanitary requirements of this code as necessary to ensure the public health, safety and general welfare.

Section ID: text-id-27436424-0

The code official is authorized to give permission to temporarily supply and use power in part of an electric installation before such installation has been fully completed and the final certificate of completion has been issued. The part covered by the temporary certificate shall comply with the requirements specified for temporary lighting, heat or power in NFPA 70.

Section ID: text-id-27436426-0

The code official is authorized to terminate such permit for a temporary use and to order the temporary use to be discontinued.

Section ID: text-id-27436428-0

A permit shall not be valid until the fees prescribed by law have been paid, nor shall an amendment to a permit be released until the additional fee, if any, has been paid.

Section ID: text-id-27436432-0

Where a permit is required, a fee for each permit shall be paid as required, in accordance with the schedule as established by the applicable governing authority.

Section ID: text-id-27436434-0

The applicant for a permit shall provide an estimated permit value at time of application. Permit valuations shall include total value of work, including materials and labor for which the permit is being issued, such as electrical, gas, mechanical, plumbing equipment and permanent systems. If, in the opinion of the code official, the valuation is underestimated on the application, the permit shall be denied unless the applicant can show detailed estimates to meet the approval of the code official. Final building permit valuation shall be set by the code official.

Section ID: text-id-27436436-0

Any person who commences any work before obtaining the necessary permits shall be subject to a fee established by the code official that shall be in addition to the required permit fees.

Section ID: text-id-27436438-0

The payment of the fee for the construction, alteration, removal or demolition of work done in connection to or concurrently with the work authorized by a permit shall not relieve the applicant or holder of the permit from the payment of other fees that are prescribed by law.

Section ID: text-id-27436440-0

The code official is authorized to establish a refund policy.

Section ID: text-id-27436442-0

Construction or work for which a permit is required shall be subject to inspection by the code official, and such construction or work shall remain visible and able to be accessed for inspection purposes until approved. Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of this code or of other ordinances of the jurisdiction. Inspections presuming to give authority to violate or cancel the provisions of this code or of other ordinances of the jurisdiction shall not be valid. It shall be the duty of the permit applicant to cause the work to remain visible and able to be accessed for inspection purposes. Neither the code

official nor the jurisdiction shall be liable for expense entailed in the removal or replacement of any material required to allow inspection.

Section ID: text-id-27436446-0

Before issuing a permit, the code official is authorized to examine or cause to be examined buildings and sites for which an application has been filed.

Section ID: text-id-27436448-0

The code official, on notification, shall make the inspections set forth in Sections 109.3.1 through 109.3.11.

Section ID: text-id-27436450-0

Footing and foundation inspections shall be made after excavations for footings are complete and any required reinforcing steel is in place. For concrete foundations, any required forms shall be in place prior to inspection. Materials for the foundation shall be on the job, except where concrete is ready-mixed in accordance with ASTM C94, the concrete need not be on the job.

Section ID: text-id-27436451-0

Concrete slab and under-floor inspections shall be made after in-slab or under-floor reinforcing steel and building service equipment, conduit, piping accessories and other ancillary equipment items are in place but before any concrete is placed or floor sheathing installed, including the subfloor.

Section ID: text-id-27436453-0

For additions and substantial improvements to existing buildings in flood hazard areas, on placement of the lowest floor, including basement, and prior to further vertical construction, the elevation documentation required in the International Building Code, or the International Residential Code, as applicable, shall be submitted to the code official.

Section ID: text-id-27436455-0

Framing inspections shall be made after the roof deck or sheathing, framing, fire blocking and bracing are in place and pipes, chimneys and vents to be concealed are complete and the rough electrical, plumbing, heating wires, pipes and ducts are approved.

Section ID: text-id-27436457-0

Lath and gypsum board inspections shall be made after lathing and gypsum board, interior and exterior, is in place but before any plastering is applied or before gypsum board joints and fasteners are taped and finished.

Section ID: text-id-27436459-0

Exception: Gypsum board that is not part of a fire-resistance-rated assembly or a shear assembly.

Section ID: text-id-27436459-1

Where the scope of work involves balconies or other elevated walking surfaces that have weather-exposed surfaces and the structural framing is protected by an impervious moisture barrier, all elements of the impervious moisture barrier system shall not be concealed until inspected and approved.

Section ID: text-id-27436461-0

Exception: Where special inspections are provided in accordance with Section 1705.1.1, Item 3, of the International Building Code.

Section ID: text-id-27436461-1

Protection of joints and penetrations in fire-resistance-rated assemblies, smoke barriers and smoke partitions shall not be concealed from view until inspected and approved.

Section ID: text-id-27436463-0

In addition to the inspections specified in Sections 109.2 through 109.3.7, the code official is authorized to make or require other inspections of any construction work to ascertain compliance with the provisions of this code and other laws that are enforced by the Department of Building Safety.

Section ID: text-id-27436465-0

Special inspections shall be required in accordance with the International Building Code.

Section ID: text-id-27436467-0

Where a building is located in a flood hazard area, documentation of the elevation of the lowest floor as required in the International Building Code or the International Residential Code, as applicable, shall be submitted to the code official prior to the final inspection.

Section ID: text-id-27436469-0

The final inspection shall be made after work required by the building permit is completed.

Section ID: text-id-27436471-0

The code official is authorized to accept reports of approved inspection agencies, provided that such agencies satisfy the requirements as to qualifications and reliability.

Section ID: text-id-27436474-0

It shall be the duty of the holder of the building permit or their duly authorized agent to notify the code official when work is ready for inspection. It shall be the duty of the permit holder to provide access to and means for any inspections of such work that are required by this code.

Section ID: text-id-27436476-0

Work shall not be done beyond the point indicated in each successive inspection without first obtaining the approval of the code official. The code official, on notification, shall make the requested inspections and shall either indicate the portion of the construction that is satisfactory as completed or shall notify the permit holder or an agent of the permit holder wherein the same fails to comply with this code. Any portions that do not comply shall be corrected and such portion shall not be covered or concealed until authorized by the code official.

Section ID: text-id-27436478-0

A structure shall not be used or occupied in whole or in part, and a change of occupancy of a structure or portion thereof shall not be made until the code official has issued a certificate of occupancy therefor as provided herein. Issuance of a certificate of occupancy shall not be construed as an approval of a violation of the provisions of this code or of other ordinances of the jurisdiction. Certificates presuming to give authority to violate or cancel the provisions of this code or other ordinances of the jurisdiction shall not be valid.

Section ID: text-id-27436482-0

Exception: Certificates of occupancy are not required for work exempt from permits in accordance with Section 105.2.

Section ID: text-id-27436482-1

After the code official inspects the structure and does not find violations of the provisions of this code or other laws that are enforced by the department, the code official shall issue a certificate of occupancy that contains the following:

Section ID: text-id-27436484-0

1. The permit number.

Section ID: text-id-27436484-1

2. The address of the structure.

Section ID: text-id-27436484-2

3. The name and address of the owner or the owner’s authorized agent.

Section ID: text-id-27436484-3

4. A description of that portion of the structure for which the certificate is issued.

Section ID: text-id-27436484-4

5. A statement that the described portion of the structure has been inspected for compliance with the requirements of this code for the occupancy and division of occupancy and the use for which the proposed occupancy is classified.

Section ID: text-id-27436484-5

6. The name of the code official.

Section ID: text-id-27436484-6

7. The edition of the code under which the permit was issued.

Section ID: text-id-27436484-7

8. The use and occupancy in accordance with the provisions of the International Building Code.

Section ID: text-id-27436484-8

9. The type of construction as defined in the International Building Code.

Section ID: text-id-27436484-9

10. The design occupant load and any impact the alteration has on the design occupant load of the area not within the scope of the work.

Section ID: text-id-27436484-10

11. Where an automatic sprinkler system is provided, and whether an automatic sprinkler system is required.

Section ID: text-id-27436484-11

12. Any special stipulations and conditions of the building permit.

Section ID: text-id-27436484-12

The code official is authorized to issue a temporary certificate of occupancy before the completion of the entire work covered by the permit, provided that such portion or portions shall be occupied safely. The code official shall set a time period during which the temporary certificate of occupancy is valid.

Section ID: text-id-27436486-0

The code official is authorized to suspend or revoke a certificate of occupancy or completion issued under the provisions of this code, in writing, wherever the certificate is issued in error or on the basis of incorrect information supplied, or where it is determined that the building or structure or portion thereof is in violation of the provisions of this code or other ordinance of the jurisdiction.

Section ID: text-id-27436488-0

A person shall not make connections from a utility, source of energy, fuel, power, water system or sewer system to any building or system that is regulated by this code for which a permit is required, until approved by the code official.

Section ID: text-id-27436492-0

The code official shall have the authority to authorize the temporary connection of the building or system to the utility, source of energy, fuel, power, water system or sewer system for the purpose of testing systems or for use under a temporary approval.

Section ID: text-id-27436494-0

The code official shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards in case of emergency where necessary to eliminate an immediate hazard to life or property or where such utility connection has been made without the approval required by Section 111.1 or 111.2. The code official shall notify the serving utility and, wherever possible, the owner or the owner’s authorized agent and the occupant of the building, structure or service system of the decision to disconnect prior to taking such action. If not notified prior to disconnecting, the owner, the owner’s authorized agent or occupant of the building, structure or service system shall be notified in writing, as soon as practical thereafter.

Section ID: text-id-27436496-0

In order to hear and decide appeals of orders, decisions or determinations made by the code official relative to the application and interpretation of this code, there shall be and is hereby created a board of appeals. The board of appeals shall be appointed by the applicable governing authority and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business and shall render all decisions and findings in writing to the appellant with a duplicate copy to the code official.

Section ID: text-id-27436500-0

An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an equivalent or better form of construction is proposed. The board shall not have authority to waive requirements of this code or interpret the administration of this code.

Section ID: text-id-27436502-0

The board of appeals shall consist of members who are qualified by experience and training to pass on matters pertaining to building construction and are not employees of the jurisdiction.

Section ID: text-id-27436504-0

The code official shall take immediate action in accordance with the decision of the board.

Section ID: text-id-27436506-0

It shall be unlawful for any person, firm or corporation to repair, alter, extend, add, move, remove, demolish or change the occupancy of any building or equipment regulated by this code or cause same to be done in conflict with or in violation of any of the provisions of this code.

Section ID: text-id-27436510-0

The code official is authorized to serve a notice of violation or order on the person responsible for the repair, alteration, extension, addition, moving, removal, demolition or change in the occupancy of a building in violation of the provisions of this code or in violation of a permit or certificate issued under the provisions of this code. Such order shall direct the discontinuance of the illegal action or condition and the abatement of the violation.

Section ID: text-id-27436512-0

If the notice of violation is not complied with promptly, the code official is authorized to request the legal counsel of the jurisdiction to institute the appropriate proceeding at law or in equity to restrain, correct or abate such violation or to require the removal or termination of the unlawful occupancy of the building or structure in violation of the provisions of this code or of the order or direction made pursuant thereto.

Section ID: text-id-27436514-0

Any person who violates a provision of this code or fails to comply with any of the requirements thereof or who repairs or alters or changes the occupancy of a building or structure in violation of the approved construction documents or directive of the code official or of a permit or certificate issued under the provisions of this code shall be subject to penalties as prescribed by law.

Section ID: text-id-27436516-0

Where the code official finds any work regulated by this code being performed in a manner contrary to the provisions of this code or in a dangerous or unsafe manner, the code official is authorized to issue a stop work order.

Section ID: text-id-27436520-0

The stop work order shall be in writing and shall be given to the owner of the property, the owner’s authorized agent or the person performing the work. Upon issuance of a stop work order, the cited work shall immediately cease. The stop work order shall state the reason for the order and the conditions under which the cited work is authorized to resume.

Section ID: text-id-27436522-0

Where an emergency exists, the code official shall not be required to give a written notice prior to stopping the work.

Section ID: text-id-27436524-0

Any person who shall continue any work after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be subject to fines established by the authority having jurisdiction.

Section ID: text-id-27436526-0

Structures or existing equipment that are or hereafter become unsafe, insanitary or deficient because of inadequate means of egress facilities, inadequate light and ventilation, or that constitute a fire hazard, or are otherwise dangerous to human life or the public welfare, or that involve illegal or improper occupancy or inadequate maintenance, shall be deemed an unsafe condition. Unsafe structures shall be taken down and removed or made safe as the code official deems necessary and as provided for in this code. A vacant structure that is not secured against unauthorized entry shall be deemed unsafe.

Section ID: text-id-27436530-0

The code official shall cause a report to be filed on an unsafe condition. The report shall state the occupancy of the structure and the nature of the unsafe condition.

Section ID: text-id-27436532-0

If an unsafe condition is found, the code official shall serve on the owner of the structure or the owner’s authorized agent a written notice that describes the condition deemed unsafe and specifies the required repairs or improvements to be made to abate the unsafe condition, or that requires the unsafe building to be demolished within a stipulated time. Such notice shall require the person thus notified to declare immediately to the code official acceptance or rejection of the terms of the order.

Section ID: text-id-27436534-0

Such notice shall be deemed properly served where a copy thereof is served in accordance with one of the following methods:

Section ID: text-id-27436536-0

1. A copy is delivered to the owner or the owner’s authorized agent personally.

Section ID: text-id-27436536-1

2. A copy is sent by certified or registered mail addressed to the owner at the last known address with the return receipt requested.

Section ID: text-id-27436536-2

3. A copy is delivered in any other manner as prescribed by local law.

Section ID: text-id-27436536-3

If the certified or registered letter is returned showing that the letter was not delivered, a copy thereof shall be posted in a conspicuous place in or about the structure affected by such notice. Service of such notice in the foregoing manner on the owner’s authorized agent shall constitute service of notice on the owner.

Section ID: text-id-27436536-4

The structure or equipment determined to be unsafe by the code official is permitted to be restored to a safe condition. The owner, the owner’s authorized agent, operator or occupant of a structure, premises or equipment deemed unsafe by the code official shall abate or cause to be abated or corrected such unsafe conditions either by repair, rehabilitation, demolition or other approved corrective action. To the extent that repairs, alterations or additions are made, or a change of occupancy occurs during the restoration of the structure, such repairs, alterations, additions or change of occupancy shall comply with the requirements of this code.

Section ID: text-id-27436538-0

Where, in the opinion of the code official, there is imminent danger of failure or collapse of a building that endangers life, or where any building or part of a building has fallen and life is endangered by the occupation of the building, or where there is actual or potential danger to the building occupants or those in the proximity of any structure because of explosives, explosive fumes or vapors, or the presence of toxic fumes, gases, or materials, or operation of defective or dangerous equipment, the code official is hereby authorized and empowered to order and require the occupants to vacate the premises forthwith. The code official shall cause to be posted at each entrance to such structure a notice reading as follows: “This Structure Is Unsafe and Its Occupancy Has Been Prohibited by the Code Official.” It shall be unlawful for any person to enter such structure except for the purpose of securing the structure, making the required repairs, removing the hazardous condition, or of demolishing the same.

Section ID: text-id-27436542-0

Notwithstanding other provisions of this code, whenever, in the opinion of the code official, there is imminent danger due to an unsafe condition, the code official shall order the necessary work to be done, including the boarding up of openings, to render such structure temporarily safe whether or not the legal procedure herein described has been instituted; and shall cause such other action to be taken as the code official deems necessary to meet such emergency.

Section ID: text-id-27436544-0

Where necessary for public safety, the code official shall temporarily close structures and close or order the authority having jurisdiction to close sidewalks, streets, public ways and places adjacent to unsafe structures, and prohibit the same from being utilized.

Section ID: text-id-27436546-0

For the purposes of this section, the code official shall employ the necessary labor and materials to perform the required work as expeditiously as possible.

Section ID: text-id-27436548-0

Costs incurred in the performance of emergency work shall be paid by the jurisdiction. The legal counsel of the jurisdiction shall institute appropriate action against the owner of the premises or the owner’s authorized agent where the unsafe structure is or was located for the recovery of such costs.

Section ID: text-id-27436550-0

Any person ordered to take emergency measures shall comply with such order forthwith. Any affected person shall thereafter, on petition directed to the appeals board, be afforded a hearing as described in this code.

Section ID: text-id-27436552-0

The code official shall order the owner or owner’s authorized agent of any premises on which is located any structure that in the code official’s judgment is so old or dilapidated, or has become so out of repair as to be dangerous, unsafe, insanitary or otherwise unfit for human habitation of occupancy, and such that it is unreasonable to repair the structure, to demolish and remove such structure; or if such structure is capable of being made safe by repairs, to repair and make safe and sanitary or to demolish and remove to the owner’s or the owner’s authorized agent’s option; or where there has been a cessation of normal construction of any structure for a period of more than two years, to demolish and remove such structure.

Section ID: text-id-27436556-0

Notices and orders shall comply with Section 113.

Section ID: text-id-27436558-0

If the owner or the owner’s authorized agent of a premises fails to comply with a demolition order within the time prescribed, the code official shall cause the structure to be demolished and removed, either through an available public agency or by contract or arrangement with private persons, and the cost of such demolition and removal shall be charged against the real estate on which the structure is located and shall be a lien on such real estate.

Section ID: text-id-27436560-0

Where any structure has been ordered demolished and removed, the governing body or other designated officer under said contract or arrangement aforesaid shall have the right to sell the salvage and valuable materials at the highest price obtainable. The net proceeds of such sale, after deducting the expenses of such demolition and removal, shall be promptly remitted with a report of such sale or transaction, including the items of expense and the amounts deducted, for the person who is entitled thereto, subject to any order of a court. If such a surplus does not remain to be turned over, the report shall so state.

Section ID: text-id-27436562-0

CHAPTER 10 CHANGE OF OCCUPANCY

Section ID: text-id-27437437 | Section Number: 27437437

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Section ID: text-id-27437437-0

About this chapter: The purpose of this chapter is to provide regulations for the circumstances where an existing building is subject to a change of occupancy or a change of occupancy classification. A change of occupancy is not to be confused with a change of occupancy classification. The International Building Code® defines different occupancy classifications in Chapter 3 and special occupancy requirements in Chapter 4. Within specific occupancy classifications there can be many different types of actual activities that can take place. For instance, a Group A-3 occupancy classification deals with a wide variation of different types of activities, including bowling alleys and courtrooms, indoor tennis courts and dance halls. When a facility changes use from, for example, a bowling alley to a dance hall, the occupancy classification remains A-3, but the different uses could lead to drastically different code requirements. Therefore, this chapter deals with the special circumstances that are associated with a change in the use of a building within the same occupancy classification as well as a change of occupancy classification.

Section ID: text-id-27437437-1

The provisions of this chapter shall apply where a change of occupancy occurs, as defined in Section 202.

Section ID: text-id-27437439-0

A change of occupancy or a change of occupancy within a space where there is a different fire protection system threshold requirement in Chapter 9 of the International Building Code shall not be made to any structure without the approval of the code official. A certificate of occupancy shall be issued where it has been determined that the requirements for the change of occupancy have been met.

Section ID: text-id-27437441-0

Any work undertaken in connection with a change in use that does not involve a change of occupancy classification or a change to another group within an occupancy classification shall conform to the applicable requirements for the work as classified in Chapter 6 and to the requirements of Sections 1002 through 1010.

Section ID: text-id-27437442-0

Exception: As modified in Section 1204 for historic buildings.

Section ID: text-id-27437442-1

Where the occupancy classification of a building changes, the provisions of Sections 1002 through 1011 shall apply. This includes a change of occupancy classification and a change to another group within an occupancy classification.

Section ID: text-id-27437444-0

Where the occupancy classification or group of a portion of an existing building is changed, Section 1011 shall apply.

Section ID: text-id-27437445-0

A certificate of occupancy shall be issued where a change of occupancy occurs that results in a different occupancy classification as determined by the International Building Code.

Section ID: text-id-27437449-0

Where an existing building or part of an existing building undergoes a change of occupancy to one of the special use or occupancy categories as described in Chapter 4 in the International Building Code, the building shall comply with all of the requirements of Chapter 4 of the International Building Code applicable to the special use or occupancy.

Section ID: text-id-27437453-0

Where a portion of a building undergoes a change of occupancy to one of the incidental uses listed in Table 509.1 of the International Building Code, the incidental use shall comply with Section 509 of the International Building Code applicable to the incidental use.

Section ID: text-id-27437455-0

Where a change of occupancy occurs to a Group I-2 or I-1 facility, the work area with the change of occupancy shall comply with the International Building Code.

Section ID: text-id-27437457-0

Exception:

Section ID: text-id-27437457-1

A change in use or occupancy in the following cases shall not be required to meet the International Building Code:

Section ID: text-id-27437457-2

1. Group I-2, Condition 2 to Group I-2, Condition 1.

Section ID: text-id-27437457-3

2. Group I-2 to ambulatory health care.

Section ID: text-id-27437457-4

3. Group I-2 to Group I-1.

Section ID: text-id-27437457-5

4. Group I-1, Condition 2 to Group I-1, Condition 1.

Section ID: text-id-27437457-6

In Group I-2 occupancies, equipped throughout with an automatic sprinkler in accordance with Section 903.3.1.1 of the International Building Code, where a room 250 square feet (23.2 m2) or less undergoes a change in occupancy to a storage room, the room shall be separated from the remainder of the building by construction capable of resisting the passage of smoke in accordance with Section 509.4.2 of the International Building Code.

Section ID: text-id-27437459-0

Building elements and materials in portions of buildings undergoing a change of occupancy classification shall comply with Section 1011.

Section ID: text-id-27437463-0

Fire protection requirements of Section 1011 shall apply where a building or portions thereof undergo a change of occupancy classification or where there is a change of occupancy within a space where there is a different fire protection system threshold requirement in Chapter 9 of the International Building Code.

Section ID: text-id-27437467-0

Means of egress in portions of buildings undergoing a change of occupancy classification shall comply with Section 1011.

Section ID: text-id-27437471-0

Structural elements carrying tributary live loads from an area with a change of occupancy shall satisfy the requirements of Section 1607 of the International Building Code. Design live loads for areas of new occupancy shall be based on Section 1607 of the International Building Code. Design live loads for other areas shall be permitted to use previously approved design live loads.

Section ID: text-id-27437475-0

Exception: Structural elements whose demand-capacity ratio considering the change of occupancy is not more than 5 percent greater than the demand-capacity ratio based on previously approved live loads.

Section ID: text-id-27437475-1

Where a change of occupancy results in a structure being assigned to a higher risk category, the structure shall satisfy the requirements of Sections 1608 and 1609 of the International Building Code for the new risk category.

Section ID: text-id-27437477-0

Exception: Where the area of the new occupancy is less than 10 percent of the building area. The cumulative effect of occupancy changes over time shall be considered.

Section ID: text-id-27437477-1

Where a change of occupancy results in a building being assigned to a higher risk category, or where the change is from a Group S or Group U occupancy to any occupancy other than Group S or Group U, the building shall satisfy the requirements of Section 1613 of the International Building Code for the new risk category using full seismic forces.

Section ID: text-id-27437479-0

Exceptions:

Section ID: text-id-27437479-1

1. Where a change of use results in a building being reclassified from Risk Category I or II to Risk Category III and the seismic coefficient, SDS, is less than 0.33, compliance with this section is not required.

Section ID: text-id-27437479-2

2. Where the area of the new occupancy is less than 10 percent of the building area, the occupancy is not changing from a Group S or Group U occupancy, and the new occupancy is not

assigned to Risk Category IV, compliance with this section is not required. The cumulative effect of occupancy changes over time shall be considered.

Section ID: text-id-27437479-3

3. Unreinforced masonry bearing wall buildings assigned to Risk Category III and to Seismic Design Category A or B shall be permitted to use Appendix Chapter A1 of this code.

Section ID: text-id-27437479-4

4.Where the change is from a Group S or Group U occupancy and there is no change of risk category, use of reduced seismic forces shall be permitted.

Section ID: text-id-27437479-5

Any structure that provides operational access to an adjacent structure assigned to Risk Category IV as the result of a change of occupancy shall itself satisfy the requirements of Sections 1608, 1609 and 1613 of the International Building Code. For compliance with Section 1613 of the International Building Code, the full seismic forces shall be used. Where operational access to Risk Category IV is less than 10 feet (3048 mm) from either an interior lot line or from another structure, access protection from potential falling debris shall be provided.

Section ID: text-id-27437481-0

Where the occupancy of an existing building or part of an existing building is changed to one of the following special occupancies as described in NFPA 70, the electrical wiring and equipment of the building or portion thereof that contains the proposed occupancy shall comply with the applicable requirements of NFPA 70. Health care facilities, including Group I-2, ambulatory health care facilities and outpatient clinics, shall also comply with the applicable requirements of NFPA 99:

Section ID: text-id-27437485-0

1. Hazardous locations.

Section ID: text-id-27437485-1

2. Commercial garages, repair and storage.

Section ID: text-id-27437485-2

3. Aircraft hangars.

Section ID: text-id-27437485-3

4. Gasoline dispensing and service stations.

Section ID: text-id-27437485-4

5. Bulk storage plants.

Section ID: text-id-27437485-5

6. Spray application, dipping and coating processes.

Section ID: text-id-27437485-6

7. Health care facilities, including Group I-2, ambulatory health care facilities and outpatient clinics.

Section ID: text-id-27437485-7

8. Places of assembly.

Section ID: text-id-27437485-8

9. Theaters, audience areas of motion picture and television studios, and similar locations.

Section ID: text-id-27437485-9

10. Motion picture and television studios and similar locations.

Section ID: text-id-27437485-10

11.Motion picture projectors.

Section ID: text-id-27437485-11

12.Agricultural buildings.

Section ID: text-id-27437485-12

Where the occupancy of an existing building or part of an existing building is changed, all unsafe conditions shall be corrected without requiring that all parts of the electrical system comply with NFPA 70.

Section ID: text-id-27437487-0

Where the occupancy of an existing building or part of an existing building is changed, electrical service shall be upgraded to meet the requirements of NFPA 70 for the new occupancy.

Section ID: text-id-27437489-0

Where the occupancy of an existing building or part of an existing building is changed, the number of electrical outlets shall comply with NFPA 70 for the new occupancy.

Section ID: text-id-27437491-0

Where the occupancy of an existing building or part of an existing building is changed such that the new occupancy is subject to different kitchen exhaust requirements or to increased mechanical ventilation requirements in accordance with the International Mechanical Code, the new occupancy shall comply with the respective International Mechanical Code provisions.

Section ID: text-id-27437495-0

Where the occupancy of an existing building or part of an existing building is changed such that the new occupancy is subject to increased or different plumbing fixture requirements or to increased water supply requirements in accordance with the International Plumbing Code, the new occupancy shall comply with the intent of the respective International Plumbing Code provisions.

Section ID: text-id-27437499-0

Exception:

Section ID: text-id-27437499-2

Only where the occupant load of the story is increased by more than 20 percent, plumbing fixtures for the story shall be provided in quantities specified in the International Plumbing Code based on the increased occupant load.

Section ID: text-id-27437499-3

If the new occupancy is a food-handling establishment, all existing sanitary waste lines above the food or drink preparation or storage areas shall be panned or otherwise protected to prevent leaking pipes or condensation on pipes from contaminating food or drink. New drainage lines shall not be installed above such areas and shall be protected in accordance with the International Plumbing Code.

Section ID: text-id-27437501-0

If the new occupancy will produce grease or oil-laden wastes, interceptors shall be provided as required in the International Plumbing Code.

Section ID: text-id-27437503-0

If the new occupancy will produce chemical wastes, the following shall apply:

Section ID: text-id-27437505-0

1. If the existing piping is not compatible with the chemical waste, the waste shall be neutralized prior to entering the drainage system or the piping shall be changed to a compatible material.

Section ID: text-id-27437505-1

2. Chemical waste shall not discharge to a public sewer system without the approval of the sewage authority.

Section ID: text-id-27437505-2

If the occupancy group is changed to Group I-2, the plumbing system and medical gas system shall comply with the applicable requirements of the International Plumbing Code.

Section ID: text-id-27437507-0

Light and ventilation shall comply with the requirements of the International Building Code for the new occupancy.

Section ID: text-id-27437511-0

The provisions of this section shall apply to buildings or portions thereof undergoing a change of occupancy classification. This includes a change of occupancy classification within a group as well as a change of occupancy classification from one group to a different group or where there is a change of occupancy within a space where there is a different fire protection system threshold requirement in Chapter 9 of the International Building Code. Such buildings shall also comply with Sections 1002 through 1010 of this code.

Section ID: text-id-27437515-0

Fire protection systems shall be provided in accordance with Sections 1011.2.1 and 1011.2.2.

Section ID: text-id-27437517-0

Where a change in occupancy classification occurs or where there is a change of occupancy within a space where there is a different fire protection system threshold requirement in Chapter 9 of the International Building Code that requires an automatic fire sprinkler system to be provided based on the new occupancy in accordance with Chapter 9 of the International Building Code. The installation of the automatic sprinkler system shall be required within the area of the change of occupancy and areas of the building not separated horizontally and vertically from the change of occupancy by one of the following:

Section ID: text-id-27437518-0

1. Nonrated permanent partition and horizontal assemblies.

Section ID: text-id-27437518-1

2. Fire partition.

Section ID: text-id-27437518-2

3. Smoke partition.

Section ID: text-id-27437518-3

4. Smoke barrier.

Section ID: text-id-27437518-4

5. Fire barrier.

Section ID: text-id-27437518-5

6. Fire wall.

Section ID: text-id-27437518-6

Exceptions:

Section ID: text-id-27437518-7

1. An automatic sprinkler system shall not be required in a one- or two-family dwelling constructed in accordance with the International Residential Code.

Section ID: text-id-27437518-8

2.Automatic sprinkler system shall not be required in a townhouse constructed in accordance with the International Residential Code.

Section ID: text-id-27437518-9

3. The townhouse shall be separated from adjoining units in accordance with Section R302.2 of the International Residential Code.

Section ID: text-id-27437518-10

Where a change in occupancy classification occurs or where there is a change of occupancy within a space where there is a different fire protection system threshold requirement in Chapter 9 of the International Building Code that requires a fire alarm and detection system to be provided based on the new occupancy in accordance with Chapter 9 of the International Building Code, such system shall be provided throughout the area where the change of occupancy occurs. Existing alarm notification appliances shall be automatically activated throughout the building. Where the building is not equipped with a fire alarm system, alarm notification appliances shall be provided throughout the area where the change of occupancy occurs in accordance with Section 907 of the International Building Code as required for new construction.

Section ID: text-id-27437520-0

In areas of the building undergoing the change of occupancy classification, the interior finish of walls and ceilings shall comply with the requirements of the International Building Code for the new occupancy classification.

Section ID: text-id-27437523-0

In Group E occupancies, where the work area is a Level 3 alteration, enhanced classroom acoustics shall be provided in all classrooms with a volume of 20,000 cubic feet (565 m3) or less. Enhanced classroom acoustics shall comply with the reverberation time in Section 808 of ICC A117.1.

Section ID: text-id-27437525-0

Hazard categories in regard to life safety and means of egress shall be in accordance with Table 1011.5.

Section ID: text-id-27437527-0

TABLE 1011.5

Section ID: text-id-27437528-0

MEANS OF EGRESS HAZARD CATEGORIES

Section ID: text-id-27437528-1

Where a change of occupancy classification is made to a higher-hazard category (lower number) as shown in Table 1011.5, the means of egress shall comply with the requirements of Chapter 10 of the International Building Code.

Section ID: text-id-27437543-0

Exceptions:

Section ID: text-id-27437543-1

1. Stairways shall be enclosed in compliance with the applicable provisions of Section 903.1.

Section ID: text-id-27437543-2

2. Existing stairways including handrails and guards complying with the requirements of Chapter 9 shall be permitted for continued use subject to approval of the code official.

Section ID: text-id-27437543-3

3. Any stairway replacing an existing stairway within a space where the pitch or slope cannot be reduced because of existing construction shall not be required to comply with the maximum riser height and minimum tread depth requirements.

Section ID: text-id-27437543-4

4.Existing corridor walls constructed on both sides of wood lath and plaster in good condition or 1/2-inch-thick (12.7 mm) gypsum wallboard shall be permitted. Such walls shall either terminate at the underside of a ceiling of equivalent construction or extend to the underside of the floor or roof next above.

Section ID: text-id-27437543-5

5. Existing corridor doorways, transoms and other corridor openings shall comply with the requirements in Sections 804.6.1, 804.6.2 and 804.6.3.

Section ID: text-id-27437543-6

6. Existing dead-end corridors shall comply with the requirements in Section 804.7.

Section ID: text-id-27437543-7

7. An operable window complying with Section 1011.5.6 shall be accepted as an emergency escape and rescue opening.

Section ID: text-id-27437543-8

Where a change of occupancy classification is made to an equal or lesser-hazard category (higher number) as shown in Table 1011.5, existing elements of the means of egress shall comply with the requirements of Section 905 for the new occupancy classification. Newly constructed or configured means of egress shall comply with the requirements of Chapter 10 of the International Building Code.

Section ID: text-id-27437545-0

Exception: Any stairway replacing an existing stairway within a space where the pitch or slope cannot be reduced because of existing construction shall not be required to comply with the maximum riser height and minimum tread depth requirements.

Section ID: text-id-27437545-1

Egress capacity shall meet or exceed the occupant load as specified in the International Building Code for the new occupancy.

Section ID: text-id-27437547-0

Existing stairways shall comply with the handrail requirements of Section 804.10 in the area of the change of occupancy classification.

Section ID: text-id-27437549-0

Existing guards shall comply with the requirements in Section 804.12 in the area of the change of occupancy classification.

Section ID: text-id-27437551-0

Where a change of occupancy would require an emergency escape and rescue opening in accordance with Section 1031 of the International Building Code, operable windows serving as the emergency escape and rescue opening shall comply with the following:

Section ID: text-id-27437553-0

1.An existing operable window shall provide a minimum net clear opening of 4 square feet (0.38 m2) with a minimum net clear opening height of 22 inches (559 mm) and a minimum net clear opening width of 20 inches (508 mm).

Section ID: text-id-27437553-1

2.A replacement window where such window complies with both of the following:

Section ID: text-id-27437553-2

2.1.The replacement window meets the size requirements in Item 1.

Section ID: text-id-27437553-3

2.2. The replacement window is the manufacturer’s largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.

Section ID: text-id-27437553-4

Hazard categories in regard to height and area shall be in accordance with Table 1011.6.

Section ID: text-id-27437556-0

TABLE 1011.6

Section ID: text-id-27437557-0

HEIGHTS AND AREAS HAZARD CATEGORIES

Section ID: text-id-27437557-1

Where a change of occupancy classification is made to a higher-hazard category as shown in Table 1011.6, heights and areas of buildings and structures shall comply with the requirements of Chapter 5 of the International Building Code for the new occupancy classification.

Section ID: text-id-27437570-0

Exception: For high-rise buildings constructed in compliance with a previously issued permit, the type of construction reduction specified in Section 403.2.1 of the International Building Code is permitted. This shall include the reduction for columns. The high-rise building is required to be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 of the International Building Code.

Section ID: text-id-27437570-1

In other than Groups H, F-1 and S-1, fire barriers and horizontal assemblies constructed in accordance with Sections 707 and 711, respectively, of the International Building Code shall be permitted to be used in lieu of fire walls to subdivide the building into separate buildings for the purpose of complying with the area limitations required for the new occupancy where all of the following conditions are met:

Section ID: text-id-27437571-0

1. The buildings are protected throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 of the International Fire Code.

Section ID: text-id-27437571-1

2. The maximum allowable area between fire barriers, horizontal assemblies or any combination thereof shall not exceed the maximum allowable area determined in accordance with Chapter 5 of the International Building Code without an increase allowed for an automatic sprinkler system in accordance with Section 506 of the International Building Code.

Section ID: text-id-27437571-2

3. The fire-resistance rating of the fire barriers and horizontal assemblies shall be not less than that specified for fire walls in Table 706.4 of the International Building Code.

Section ID: text-id-27437571-3

Exception: Where horizontal assemblies are used to limit the maximum allowable area, the required fire resistance rating of the horizontal assemblies shall be permitted to be reduced by 1 hour provided that the height and number of stories increases allowed for an automatic sprinkler system by Section 504 of the International Building Code are not used for the buildings.

Section ID: text-id-27437571-4

Where a change of occupancy classification is made to an equal or lesser-hazard category as shown in Table 1011.6, the height and area of the existing building shall be deemed acceptable.

Section ID: text-id-27437574-0

Where a change of occupancy classification is made to a higher-hazard category as shown in Table 1011.6, fire barriers in separated mixed use buildings shall comply with the fire-resistance requirements of the International Building Code.

Section ID: text-id-27437576-0

Exception: Where the fire barriers are required to have a 1-hour fire-resistance rating, existing wood lath and plaster in good condition or existing 1/2-inch-thick (12.7 mm) gypsum wallboard shall be permitted.

Section ID: text-id-27437576-1

Hazard categories in regard to fire-resistance ratings of exterior walls shall be in accordance with Table 1011.7.

Section ID: text-id-27437579-0

TABLE 1011.7

Section ID: text-id-27437580-0

EXPOSURE OF EXTERIOR WALLS HAZARD CATEGORIES

Section ID: text-id-27437580-1

Where a change of occupancy classification is made to a higher hazard category as shown in Table 1011.7, exterior walls shall have fire resistance and exterior opening protectives as required by the International Building Code.

Section ID: text-id-27437593-0

Exception: A 2-hour fire-resistance rating shall be allowed where the building does not exceed three stories in height and is classified as one of the following groups: A-2 and A-3 with an occupant load of less than 300, B, F, M or S.

Section ID: text-id-27437593-1

Where a change of occupancy classification is made to an equal or lesser-hazard category as shown in Table 1011.7, existing exterior walls, including openings, shall be accepted.

Section ID: text-id-27437595-0

Openings in exterior walls shall be protected as required by the International Building Code. Where openings in the exterior walls are required to be protected because of their distance from the lot line, the sum of the area of such openings shall not exceed 50 percent of the total area of the wall in each story.

Section ID: text-id-27437597-0

Exceptions:

Section ID: text-id-27437597-1

1. Where the International Building Code permits openings in excess of 50 percent.

Section ID: text-id-27437597-2

2. Protected openings shall not be required in buildings of Group R occupancy that do not exceed three stories in height and that are located not less than 3 feet (914 mm) from the lot line.

Section ID: text-id-27437597-3

3. Exterior opening protectives are not required where an automatic sprinkler system has been installed throughout.

Section ID: text-id-27437597-4

4. Exterior opening protectives are not required where the change of occupancy group is to an equal or lower hazard classification in accordance with Table 1011.7.

Section ID: text-id-27437597-5

Enclosure of vertical shafts shall be in accordance with Sections 1011.8.1 through 1011.8.4.

Section ID: text-id-27437600-0

Vertical shafts shall be designed to meet the International Building Code requirements for atriums or the requirements of this section.

Section ID: text-id-27437601-0

Where a change of occupancy classification is made to a higher-hazard category as shown in Table 1011.5, interior stairways shall be enclosed as required by the International Building Code.

Section ID: text-id-27437603-0

Exceptions:

Section ID: text-id-27437603-1

1. In other than Group I occupancies, an enclosure shall not be required for openings serving only one adjacent floor and that are not connected with corridors or stairways serving other floors.

Section ID: text-id-27437603-2

2. Unenclosed existing stairways need not be enclosed in a continuous vertical shaft if each story is separated from other stories by 1-hour fire-resistance-rated construction or approved wired glass set in steel frames and all exit corridors are sprinklered. The openings between the corridor and the occupant space shall have not fewer than one sprinkler head above the openings on the tenant side. The sprinkler system shall be permitted to be supplied from the domestic water-supply systems, provided that the system is of adequate pressure, capacity and sizing for the combined domestic and sprinkler requirements.

Section ID: text-id-27437603-3

3. Existing penetrations of stairway enclosures shall be accepted if they are protected in accordance with the International Building Code.

Section ID: text-id-27437603-4

Interior vertical shafts other than stairways, including but not limited to elevator hoistways and service and utility shafts, shall be enclosed as required by the International Building Code where there is a change of use to a higher-hazard category as specified in Table 1011.5.

Section ID: text-id-27437605-0

Exceptions:

Section ID: text-id-27437605-1

1. Existing 1-hour interior shaft enclosures shall be accepted where a higher rating is required.

Section ID: text-id-27437605-2

2. Vertical openings, other than stairways, in buildings of other than Group I occupancy and connecting less than six stories shall not be required to be enclosed if the entire building is provided with an approved automatic sprinkler system.

Section ID: text-id-27437605-3

Openings into existing vertical shaft enclosures shall be protected by fire assemblies having a fire protection rating of not less than 1 hour and shall be maintained self-closing or shall be automatic-closing by actuation of a smoke detector. Other openings shall be fire protected in an approved manner. Existing fusible link-type automatic door-closing devices shall be permitted in all shafts except stairways if the fusible link rating does not exceed 135°F (57°C).

Section ID: text-id-27437607-0

CHAPTER 11 ADDITIONS

Section ID: text-id-27437612 | Section Number: 27437612

User Note: User note:About this chapter: Chapter 11 provides the requirements for additions, which corre

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Section ID: text-id-27437612-0

About this chapter: Chapter 11 provides the requirements for additions, which correlate to the code requirements for new construction. There are, however, some exceptions that are specifically stated within this chapter. An “Addition” is defined in Chapter 2 as “an extension or increase in the floor area, number of stories or height of a building or structure.” Chapter 11 contains the minimum requirements for an addition that is not separated from the existing building by a fire wall.

Section ID: text-id-27437612-1

An addition to a building or structure shall comply with the International Codes as adopted for new construction without requiring the existing building or structure to comply with any requirements of those codes or of these provisions, except as required by this chapter. Where an addition impacts the existing building or structure, that portion shall comply with this code.

Section ID: text-id-27437614-0

An addition shall not create or extend any nonconformity in the existing building to which the addition is being made with regard to accessibility, structural strength, fire safety, means of egress or the capacity of mechanical, plumbing or electrical systems.

Section ID: text-id-27437616-0

Any repair or alteration work within an existing building to which an addition is being made shall comply with the applicable requirements for the work as classified in Chapter 6.

Section ID: text-id-27437618-0

In Group E occupancies, enhanced classroom acoustics shall be provided in all classrooms in the addition with a volume of 20,000 cubic feet (565 m3) or less. Enhanced classroom acoustics shall comply with the reverberation time in Section 808 of ICC A117.1.

Section ID: text-id-27437620-0

An addition shall not increase the height of an existing building beyond that permitted under the applicable provisions of Chapter 5 of the International Building Code for new buildings.

Section ID: text-id-27437624-0

An addition shall not increase the area of an existing building beyond that permitted under the applicable provisions of Chapter 5 of the International Building Code for new buildings unless fire separation as required by the International Building Code is provided.

Section ID: text-id-27437626-0

Exception: In-filling of floor openings and nonoccupiable appendages such as elevator and exit stairway shafts shall be permitted beyond that permitted by the International Building Code.

Section ID: text-id-27437626-1

Existing fire areas increased by the addition shall comply with Chapter 9 of the International Building Code.

Section ID: text-id-27437628-0

Any existing gravity load-carrying structural element for which an addition and its related alterations cause an increase in design dead, live or snow load, including snow drift effects, of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the International Building Code for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the addition and its related alterations shall be considered to be an altered element subject to the requirements of Section 805.2. Any existing element that will form part of the lateral load path for any part of the addition shall be considered to be an existing lateral load-carrying structural element subject to the requirements of Section 1103.3.

Section ID: text-id-27437632-0

Exception: Buildings of Group R occupancy with not more than five dwelling units or sleeping units used solely for residential purposes where the existing building and the addition together comply with the conventional light-frame construction methods of the International Building Code or the provisions of the International Residential Code.

Section ID: text-id-27437632-1

Where the addition is structurally independent of the existing structure, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the addition is not structurally independent of the existing structure, the existing structure and its addition acting together as a single structure shall meet the requirements of Sections 1609 and 1613 of the International Building Code using full seismic forces.

Section ID: text-id-27437634-0

Exceptions:

Section ID: text-id-27437634-1

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the existing building and the addition comply with the conventional light-frame construction methods of the International Building Code or the provisions of the International Residential Code.

Section ID: text-id-27437634-2

2. Any existing lateral load-carrying structural element whose demand-capacity ratio with the addition considered is not more than 10 percent greater than its demand-capacity ratio with the addition ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the International Building Code. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of additions and alterations since original construction.

Section ID: text-id-27437634-3

Additions and foundations in flood hazard areas shall comply with the following requirements:

Section ID: text-id-27437636-0

1. For horizontal additions that are structurally interconnected to the existing building:

Section ID: text-id-27437636-1

1.1. If the addition and all other proposed work, when combined, constitute substantial improvement, the existing building and the addition shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

Section ID: text-id-27437636-2

1.2. If the addition constitutes substantial improvement, the existing building and the addition shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

Section ID: text-id-27437636-3

2. For horizontal additions that are not structurally interconnected to the existing building:

Section ID: text-id-27437636-4

2.1. The addition shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

Section ID: text-id-27437636-5

2.2. If the addition and all other proposed work, when combined, constitute substantial improvement, the existing building and the addition shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

Section ID: text-id-27437636-6

3. For vertical additions and all other proposed work that, when combined, constitute substantial improvement, the existing building shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

Section ID: text-id-27437636-7

4. For a raised or extended foundation, if the foundation work and all other proposed work, when combined, constitute substantial improvement, the existing building shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

Section ID: text-id-27437636-8

5. For a new foundation or replacement foundation, the foundation shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

Section ID: text-id-27437636-9

Additions to existing buildings shall conform to the energy requirements of the International Energy Conservation Code or International Residential Code as they relate to new construction.

Section ID: text-id-27437640-0

CHAPTER 12 HISTORIC BUILDINGS

Section ID: text-id-27437644 | Section Number: 27437644

User Note: User note:About this chapter: Chapter 12 provides some exceptions from code requirements w

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Section ID: text-id-27437644-0

About this chapter: Chapter 12 provides some exceptions from code requirements when the building in question has historic value. The most important criterion for application of this chapter is that the building must be essentially accredited as being of historic significance by a state or local authority after careful review of the historical value of the building. Most, if not all, states have such authorities, as do many local jurisdictions. The agencies with such authority can be located at the state or local government level or through the local chapter of the American Institute of Architects (AIA). Other considerations include the structural condition of the building (i.e., is the building structurally sound), its proposed use, its impact on life safety and how the intent of the code, if not the letter, will be achieved.

Section ID: text-id-27437644-1

This chapter is intended to provide means for the preservation of historic buildings. Historic buildings shall comply with the provisions of this chapter relating to their repair, alteration, relocation and change of occupancy.

Section ID: text-id-27437646-0

A historic building undergoing alteration or change of occupancy shall be investigated and evaluated. If it is intended that the building meet the requirements of this chapter, a written report shall be prepared and filed with the code official by a registered design professional where such a report is necessary in the opinion of the code official. Such report shall be in accordance with Chapter 1 and shall identify each required safety feature that is in compliance with this chapter and where compliance with other chapters of these provisions would be damaging to the contributing historic features. For buildings assigned to Seismic Design Category D, E or F, a structural evaluation describing, at a minimum, the vertical and horizontal elements of the lateral force-resisting system and any strengths or weaknesses therein shall be prepared. Additionally, the report shall describe each feature that is not in compliance with these provisions and shall demonstrate how the intent of these provisions is complied with in providing an equivalent level of safety.

Section ID: text-id-27437648-0

Where a building in Group R-3 is used for Group A, B or M purposes such as museum tours, exhibits and other public assembly activities, or for museums less than 3,000 square feet (279 m2), the code official is authorized to determine that the occupancy is Group B where life safety conditions can be demonstrated in accordance with Section 1201.2. Adequate means of egress in such buildings, including, but not limited to, a means of maintaining doors in an open position to permit egress, a limit on building occupancy to an occupant load permitted by the means of egress capacity, a limit on occupancy of certain areas or floors, or supervision by a person

knowledgeable in the emergency exiting procedures, shall be provided.

Section ID: text-id-27437650-0

In flood hazard areas, if all proposed work, including repairs, work required because of a change of occupancy, and alterations, constitutes substantial improvement, then the existing building shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

Section ID: text-id-27437652-0

Exception: If a historic building will continue to be a historic building after the proposed work is completed, then the proposed work is not considered a substantial improvement. For the purposes of this exception, a historic building is any of the following:

Section ID: text-id-27437652-1

1.Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places.

Section ID: text-id-27437652-2

2.Determined by the Secretary of the US Department of Interior to contribute to the historical significance of a registered historic district or a district preliminarily determined to qualify as a historic district.

Section ID: text-id-27437652-3

3.Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.

Section ID: text-id-27437652-4

Conditions determined by the code official to be unsafe shall be remedied. Work shall not be required beyond what is required to remedy the unsafe conditions.

Section ID: text-id-27437654-0

Repairs to any portion of a historic building or structure shall be permitted with original or like materials and original methods of construction, subject to the provisions of this chapter. Hazardous materials, such as asbestos and lead-based paint, shall not be used where the code for new construction would not permit their use in buildings of similar occupancy, purpose and location.

Section ID: text-id-27437658-0

Replacement of existing or missing features using original materials shall be permitted. Partial replacement for repairs that match the original in configuration, height and size shall be permitted.

Section ID: text-id-27437660-0

Replacement glazing in hazardous locations shall comply with the safety glazing requirements of Chapter 24 of the International Building Code.

Section ID: text-id-27437660-1

Exception: Glass block walls, louvered windows and jalousies repaired with like materials.

Section ID: text-id-27437660-2

Historic buildings undergoing alterations, changes of occupancy or that are moved shall comply with Section 1203.

Section ID: text-id-27437664-0

Every historic building that does not conform to the construction requirements specified in this code for the occupancy or use and that constitutes a distinct fire hazard as defined herein shall be provided with an approved automatic fire-extinguishing system as determined appropriate by the code official. However, an automatic fire-extinguishing system shall not be used to substitute for, or act as an alternative to, the required number of exits from any facility.

Section ID: text-id-27437666-0

Existing door openings and corridor and stairway widths less than those specified elsewhere in this code may be approved, provided that, in the opinion of the code official, there is sufficient width and height for a person to pass through the opening or traverse the means of egress. Where approved by the code official, the front or main exit doors need not swing in the direction of the path of exit travel, provided that other approved means of egress having sufficient capacity to serve the total occupant load are provided.

Section ID: text-id-27437668-0

In buildings with automatic sprinkler systems of Group R-1, R-2 or R-3, existing transoms in corridors and other fire-resistance-rated walls may be maintained if fixed in the closed position. A sprinkler shall be installed on each side of the transom.

Section ID: text-id-27437670-0

The existing interior finishes shall be accepted where it is demonstrated that they are the historic finishes.

Section ID: text-id-27437672-0

In buildings of three stories or less, exit enclosure construction shall limit the spread of smoke by the use of tight-fitting doors and solid elements. Such elements are not required to have a fire-resistance rating.

Section ID: text-id-27437674-0

Where 1-hour fire-resistance-rated construction is required by these provisions, it need not be provided, regardless of construction or occupancy, where the existing wall and ceiling finish is wood or metal lath and plaster.

Section ID: text-id-27437676-0

Historic glazing materials are permitted in interior walls required to have a 1-hour fire-resistance rating where the opening is provided with approved smoke seals and the area affected is provided with an automatic sprinkler system.

Section ID: text-id-27437678-0

Grand stairways shall be accepted without complying with the handrail and guard requirements. Existing handrails and guards at all stairways shall be permitted to remain, provided they are not structurally dangerous.

Section ID: text-id-27437680-0

Guards shall comply with Sections 1203.10.1 and 1203.10.2.

Section ID: text-id-27437682-0

Existing guards shall comply with the requirements of Section 404.

Section ID: text-id-27437683-0

The spacing between existing intermediate railings or openings in existing ornamental patterns shall be accepted. Missing elements or members of a guard may be replaced in a manner that will preserve the historic appearance of the building or structure.

Section ID: text-id-27437685-0

Where exit sign or egress path marking location would damage the historic character of the building, alternative exit signs are permitted with approval of the code official. Alternative signs shall identify the exits and egress path.

Section ID: text-id-27437688-0

Every historic building that cannot be made to conform to the construction requirements specified in the International Building Code for the occupancy or use and that constitutes a distinct fire hazard shall be deemed to be in compliance if provided with an approved automatic fire-extinguishing system.

Section ID: text-id-27437690-0

Exception: Where the code official approves an alternative life-safety system.

Section ID: text-id-27437690-1

Historic buildings undergoing a change of occupancy shall comply with the applicable provisions of Chapter 10, except as specifically permitted in this chapter. Where Chapter 10 requires compliance with specific requirements of Chapter 7, Chapter 8 or Chapter 9 and where those requirements are subject to the exceptions in Section 1202, the same exceptions shall apply to this section.

Section ID: text-id-27437694-0

The allowable floor area for historic buildings undergoing a change of occupancy shall be permitted to exceed by 20 percent the allowable areas specified in Chapter 5 of the International Building Code.

Section ID: text-id-27437696-0

Historic structures undergoing a change of use to a higher-hazard category in accordance with Section 1011.7 may use alternative methods to comply with the fire-resistance and exterior opening protective requirements. Such alternatives shall comply with Section 1201.2.

Section ID: text-id-27437698-0

Required occupancy separations of 1 hour may be omitted where the building is provided with an approved automatic sprinkler system throughout.

Section ID: text-id-27437700-0

Regardless of occupancy or use group, roof-covering materials not less than Class C, where tested in accordance with ASTM E108 or UL 790, shall be permitted where a fire-retardant roof covering is required.

Section ID: text-id-27437702-0

Existing door openings and corridor and stairway widths less than those that would be acceptable for nonhistoric buildings under these provisions shall be approved, provided that, in the opinion of the code official, there is sufficient width and height for a person to pass through the opening or traverse the exit and that the capacity of the exit system is adequate for the occupant load, or where other operational controls to limit occupancy are approved by the code official.

Section ID: text-id-27437704-0

Where approved by the code official, existing front doors need not swing in the direction of exit travel, provided that other approved exits having sufficient capacity to serve the total occupant load are provided.

Section ID: text-id-27437706-0

In corridor walls required by these provisions to be fire-resistance rated, existing transoms may be maintained if fixed in the closed position, and fixed wired glass set in a steel frame or other approved glazing shall be installed on one side of the transom.

Section ID: text-id-27437708-0

Exception: Transoms conforming to Section 1203.4 shall be accepted.

Section ID: text-id-27437708-1

Where interior finish materials are required to comply with the fire test requirements of Section 803.1 of the International Building Code, existing nonconforming materials shall be permitted to be surfaced with an approved fire-retardant coating to achieve the required classification. Compliance with this section shall be demonstrated by testing the fire-retardant coating on the same material and achieving the required fire classification. Where the same material is not available, it shall be permitted to test on a similar material.

Section ID: text-id-27437710-0

Exception: Existing nonconforming materials need not be surfaced with an approved fire-retardant coating where the building is equipped throughout with an automatic sprinkler system installed in accordance with the International Building Code and the nonconforming materials can be substantiated as being historic in character.

Section ID: text-id-27437710-1

Where 1-hour fire-resistance-rated construction is required by these provisions, it need not be provided, regardless of construction or occupancy, where the existing wall and ceiling finish is wood lath and plaster.

Section ID: text-id-27437712-0

Existing stairways shall comply with the requirements of these provisions. The code official shall grant alternatives for stairways and guards if alternative stairways are found to be acceptable or are judged to meet the intent of these provisions. Existing stairways shall comply with Section 1203.

Section ID: text-id-27437714-0

Exception: For buildings less than 3,000 square feet (279 m2), existing conditions are permitted to remain at all stairways and guards.

Section ID: text-id-27437714-1

The code official may accept alternative exit sign locations where the location of such signs would damage the historic character of the building or structure. Such signs shall identify the exits and exit path.

Section ID: text-id-27437716-0

Existing historic stairways in buildings changed to a Group R-1 or R-2 occupancy shall be accepted where it can be shown that the stairway can support a 75-pounds-per-square-foot (366 kg/m2) live load.

Section ID: text-id-27437718-0

Where it is determined by the code official that compliance with the natural light requirements of Section 1010.1 will lead to loss of historic character or historic materials in the building, the existing level of natural lighting shall be considered to be acceptable.

Section ID: text-id-27437720-0

Historic buildings shall comply with the applicable structural provisions for the work as classified in Chapter 6.

Section ID: text-id-27437724-0

Exceptions:

Section ID: text-id-27437724-1

1.The code official shall be authorized to accept existing floors and existing live loads and to approve operational controls that limit the live load on any floor.

Section ID: text-id-27437724-2

2.Repair of substantial structural damage is not required to comply with Sections 405.2.3 and 405.2.4. Substantial structural damage shall be repaired in accordance with Section 405.2.1.

Section ID: text-id-27437724-3

Conditions determined by the code official to be dangerous shall be remedied. Work shall not be required beyond what is required to remedy the dangerous condition.

Section ID: text-id-27437726-0

Foundations of relocated historic buildings and structures shall comply with the International Building Code. Relocated historic buildings shall otherwise be considered a historic building for the purposes of this code. Relocated historic buildings and structures shall be sited so that exterior wall and opening requirements comply with the International Building Code or with the compliance alternatives of this code.

Section ID: text-id-27437730-0

CHAPTER 13 PERFORMANCE COMPLIANCE METHODS

Section ID: text-id-27437734 | Section Number: 27437734

User Note: User note:About this chapter: Chapter 13 allows for existing buildings to be evaluated so as to

User note:

Section ID: text-id-27437734-0

About this chapter: Chapter 13 allows for existing buildings to be evaluated so as to show that alterations, while not meeting new construction requirements, will improve the current existing situation. Provisions are based on a numerical scoring system involving 19 various safety parameters and the degree of code compliance for each issue.

Section ID: text-id-27437734-1

The provisions of this chapter shall apply to the alteration, addition and change of occupancy of existing structures, including historic structures, as referenced in Section 301.3.3. The provisions of this chapter are intended to maintain or increase the current degree of public safety, health and general welfare in existing buildings while permitting, alteration, addition and change of occupancy without requiring full compliance with Chapters 6 through 12, except where compliance with the prescriptive method of Chapter 5 or the work area method of other provisions of this code is specifically required in this chapter.

Section ID: text-id-27437736-0

Alterations, additions and changes of occupancy to existing structures shall comply with the provisions of this chapter or with one of the methods provided in Section 301.3.

Section ID: text-id-27437737-0

Existing buildings in which there is work involving additions, alterations or changes of occupancy shall be made to conform to the requirements of this chapter or the provisions of Chapters 6 through 12. The provisions of Sections 1301.2.1 through 1301.2.6 shall apply to existing occupancies that will continue to be, or are proposed to be, in Groups A, B, E, F, I-2, M, R and S. These provisions shall also apply to Group U occupancies where such occupancies are undergoing a change of occupancy or a partial change in occupancy with separations in accordance with Section 1301.2.2. These provisions shall not apply to buildings with occupancies in Group H, I-1, I-3 or I-4.

Section ID: text-id-27437740-0

Where an existing building is changed to a new occupancy classification and this section is applicable, the provisions of this section for the new occupancy shall be used to determine compliance with this code.

Section ID: text-id-27437741-0

Where a portion of the building is changed to a new occupancy classification and that portion is separated from the remainder of the building with fire barrier or horizontal assemblies having a

fire-resistance rating as required by Table 508.4 of the International Building Code or Section R302 of the International Residential Code for the separate occupancies, or with approved compliance alternatives, the portion changed shall be made to conform to the provisions of this section. Only the portion separated shall be required to be evaluated for compliance.

Section ID: text-id-27437743-0

Where a portion of the building is changed to a new occupancy classification and that portion is not separated from the remainder of the building with fire barriers or horizontal assemblies having a fire-resistance rating as required by Table 508.4 of the International Building Code or Section R302 of the International Residential Code for the separate occupancies, or with approved compliance alternatives, the provisions of this section which apply to each occupancy shall apply to the entire building. Where there are conflicting provisions, those requirements which secure the greater public safety shall apply to the entire building or structure.

Section ID: text-id-27437743-1

Additions to existing buildings shall comply with the requirements of the International Building Code or the International Residential Code for new construction. The combined height and area of the existing building and the new addition shall not exceed the height and area allowed by Chapter 5 of the International Building Code. Where a fire wall that complies with Section 706 of the International Building Code is provided between the addition and the existing building, the addition shall be considered a separate building.

Section ID: text-id-27437745-0

An existing building or portion thereof shall not be altered in such a manner that results in the building being less safe or sanitary than such building is currently.

Section ID: text-id-27437747-0

Exception: Where the current level of safety or sanitation is proposed to be reduced, the portion altered shall conform to the requirements of the International Building Code.

Section ID: text-id-27437747-1

Where escalators are provided in below-grade transportation stations, existing and new escalators shall be permitted to have a clear width of less than 32 inches (815 mm).

Section ID: text-id-27437749-0

Plumbing fixtures shall be provided in accordance with Section 1009 for a change of occupancy and Section 808 for alterations. Plumbing fixtures for additions shall be in accordance with the International Plumbing Code.

Section ID: text-id-27437751-0

For repairs, alterations, additions and changes of occupancy to existing buildings that are evaluated in accordance with this section, compliance with this section shall be accepted by the code official.

Section ID: text-id-27437754-0

Where the code official determines that an unsafe condition exists as provided for in Section 115, such unsafe condition shall be abated in accordance with Section 115.

Section ID: text-id-27437755-0

Buildings that are evaluated in accordance with this section shall comply with the International Fire Code and International Property Maintenance Code.

Section ID: text-id-27437757-0

In flood hazard areas, buildings that are evaluated in accordance with this section shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable, if the work covered by this section constitutes substantial improvement.

Section ID: text-id-27437759-0

For proposed work covered by this chapter, the building owner shall cause the existing building to be investigated and evaluated in accordance with the provisions of Sections 1301.4 through 1301.9.

Section ID: text-id-27437762-0

The owner shall have a structural analysis of the existing building made to determine adequacy of structural systems for the proposed alteration, addition or change of occupancy. The analysis shall demonstrate that the building with the work completed is capable of resisting the loads specified in Chapter16 of the International Building Code.

Section ID: text-id-27437763-0

The results of the investigation and evaluation as required in Section 1301.4, along with proposed compliance alternatives, shall be submitted to the code official.

Section ID: text-id-27437765-0

The code official shall determine whether the existing building, with the proposed addition, alteration or change of occupancy, complies with the provisions of this section in accordance with the evaluation process in Sections 1301.5 through 1301.9.

Section ID: text-id-27437767-0

The evaluation shall be composed of three categories: fire safety, means of egress and general safety, as defined in Sections 1301.5.1 through 1301.5.3.

Section ID: text-id-27437770-0

Included within the fire safety category are the structural fire resistance, automatic fire detection, fire alarm, automatic sprinkler system and fire suppression system features of the facility.

Section ID: text-id-27437771-0

Included within the means of egress category are the configuration, characteristics and support features for means of egress in the facility.

Section ID: text-id-27437773-0

Included within the general safety category are the fire safety parameters and the means of egress parameters.

Section ID: text-id-27437775-0

The evaluation process specified herein shall be followed in its entirety to evaluate existing buildings in Groups A, B, E, F, M, R, S and U. For existing buildings in Group I-2, the evaluation process specified herein shall be followed and applied to each and every individual smoke compartment. Table 1301.7 shall be utilized for tabulating the results of the evaluation.

References to other sections of this code or other codes indicate that compliance with those sections is required in order to gain credit in the evaluation herein outlined. In applying this section to a building with mixed occupancies, where the separation between the mixed occupancies does not qualify for any category indicated in Section 1301.6.16, the score for each occupancy shall be determined, and the lower score determined for each section of the evaluation process shall apply to the entire building or to each smoke compartment for Group I-2 occupancies.

Section ID: text-id-27437778-0

Where the separation between the mixed occupancies qualifies for any category indicated in Section 1301.6.16, the score for each occupancy shall apply to each portion or smoke compartment of the building based on the occupancy of the space.

Section ID: text-id-27437778-1

The value for building height and number of stories shall be the lesser value determined by the formula in Section 1301.6.1.1. Section 504 of the International Building Code shall be used to determine the allowable height and number of stories of the building. Subtract the actual building height from the allowable height and divide by 121/2 feet (3810 mm). Enter the height value and its sign (positive or negative) in Table 1301.7 under Safety Parameter 1301.6.1, Building Height, for fire safety, means of egress and general safety. The maximum score for a building shall be 10.

Section ID: text-id-27437779-0

The following formulas shall be used in computing the building height value.

Section ID: text-id-27437780-0

where:

Section ID: text-id-27437780-1

AH = Allowable height in feet (mm) from Section 504 of the International Building Code.

Section ID: text-id-27437780-2

EBH = Existing building height in feet (mm).

Section ID: text-id-27437780-3

AS = Allowable height in stories from Section 504 of the International Building Code.

Section ID: text-id-27437780-4

EBS = Existing building height in stories.

Section ID: text-id-27437780-5

CF = 1 if (AH) – (EBH) is positive.

Section ID: text-id-27437780-6

CF = Construction-type factor shown in Table 1301.6.6(2) if (AH) – (EBH) is negative.

Section ID: text-id-27437780-7

Note: Where mixed occupancies are separated and individually evaluated as indicated in Section 1301.6, the values AH, AS, EBH and EBS shall be based on the height of the occupancy being evaluated.

Section ID: text-id-27437780-8

The value for building area shall be determined by the formula in Section 1301.6.2.2. Section 506 of the International Building Code and the formula in Section 1301.6.2.1 shall be used to determine the allowable area of the building. Enter the area value and its sign (positive or negative) in Table 1301.7 under Safety Parameter 1301.6.2, Building Area, for fire safety, means of egress and general safety. In determining the area value, the maximum permitted positive value for area is 50 percent of the fire safety score as listed in Table 1301.8, Mandatory Safety Scores. Group I-2 occupancies shall be scored zero.

Section ID: text-id-27437783-0

The following formula shall be used in computing allowable area:

Section ID: text-id-27437784-0

where:

Section ID: text-id-27437784-1

Aa = Allowable building area per story (square feet).

Section ID: text-id-27437784-2

At = Tabular allowable area factor (NS, S1, S13R, or SM value, as applicable) in accordance with Table 506.2 of the International Building Code.

Section ID: text-id-27437784-3

NS = Tabular allowable area factor in accordance with Table 506.2 of the International Building Code for a nonsprinklered building (regardless of whether the building is sprinklered).

Section ID: text-id-27437784-4

If = Area factor increase due to frontage as calculated in accordance with Section 506.3 of the International Building Code.

Section ID: text-id-27437784-5

The following formulas shall be used in computing the area value. Equation 13-4 shall be used for a single occupancy buildings and Equation 13-5 shall be used for multiple occupancy buildings. Determine the area value for each occupancy floor area on a floor-by-floor basis. For multiple occupancy, buildings with the minimum area value of the set of values obtained for the particular occupancy shall be used as the area value for that occupancy.

Section ID: text-id-27437786-0

For single occupancy buildings:

Section ID: text-id-27437786-1

For multiple occupancy buildings:

Section ID: text-id-27437786-2

where:

Section ID: text-id-27437786-3

i = Value for an individual separated occupancy on a floor.

Section ID: text-id-27437786-4

n = Number of separated occupancies on a floor.

Section ID: text-id-27437786-5

Evaluate the compartments created by fire barriers or horizontal assemblies which comply with Sections 1301.6.3.2 and 1301.6.3.3 and which are exclusive of the wall elements considered under Sections 1301.6.4 and 1301.6.5. Conforming compartments shall be figured as the net area and do not include shafts, chases, stairways, walls or columns. Using Table 1301.6.3, determine the appropriate compartmentation value (CV) and enter that value into Table 1301.7 under Safety Parameter 1301.6.3, Compartmentation, for fire safety, means of egress and general safety.

Section ID: text-id-27437789-0

TABLE 1301.6.3

Section ID: text-id-27437790-0

COMPARTMENTATION VALUES

Section ID: text-id-27437790-1

a. For compartment sizes between categories, the compartmentation value shall be obtained by linear interpolation.

Section ID: text-id-27437829-0

The categories for compartment separations are:

Section ID: text-id-27437830-0

1.Category a—Compartment size of 15,000 square feet (1394 m2) or more.

Section ID: text-id-27437830-1

2.Category b—Maximum compartment size of 10,000 square feet (929 m2).

Section ID: text-id-27437830-2

3.Category c—Maximum compartment size of 7,500 square feet (697 m2).

Section ID: text-id-27437830-3

4.Category d—Maximum compartment size of 5,000 square feet (464 m2).

Section ID: text-id-27437830-4

5.Category e—Maximum compartment size of 2,500 square feet (232 m2).

Section ID: text-id-27437830-5

A wall used to create separate compartments shall be a fire barrier conforming to Section 707 of the International Building Code with a fire-resistance rating of not less than 2 hours. Where the building is not divided into more than one compartment, the compartment size shall be taken as the total floor area on all floors. Where there is more than one compartment within a story, each compartmented area on such story shall be provided with a horizontal exit conforming to Section 1026 of the International Building Code. The fire door serving as the horizontal exit between compartments shall be so installed, fitted and gasketed that such fire door will provide a substantial barrier to the passage of smoke.

Section ID: text-id-27437832-0

A floor/ceiling assembly used to create compartments shall conform to Section 711 of the International Building Code and shall have a fire-resistance rating of not less than 2 hours.

Section ID: text-id-27437834-0

Evaluate the fire-resistance rating of floors and walls separating tenants, including dwelling units, and not evaluated under Sections 1301.6.3 and 1301.6.5. Group I-2 occupancies shall evaluate the rating of the separations between care recipient sleeping rooms.

Section ID: text-id-27437837-0

Under the categories and occupancies in Table 1301.6.4, determine the appropriate value and enter that value in Table 1301.7 under Safety Parameter 1301.6.4, Tenant and Dwelling Unit Separation, for fire safety, means of egress and general safety. The value shall be zero for single tenant buildings and buildings without dwelling units.

Section ID: text-id-27437837-1

TABLE 1301.6.4

Section ID: text-id-27437838-0

SEPARATION VALUES

Section ID: text-id-27437838-1

The categories for tenant and dwelling unit separations are:

Section ID: text-id-27437884-0

1.Category a—No fire partitions; incomplete fire partitions; no doors; doors not self-closing or automatic-closing.

Section ID: text-id-27437884-1

2.Category b—Fire partitions or floor assemblies with less than 1-hour fire-resistance ratings or not constructed in accordance with Section 708 or 711 of the International Building Code, respectively.

Section ID: text-id-27437884-2

3.Category c—Fire partitions with 1-hour or greater fire-resistance ratings constructed in accordance with Section 708 of the International Building Code and floor assemblies with 1-hour but less than 2-hour fire-resistance ratings constructed in accordance with Section 711 of the International Building Code or with only one tenant within the floor area.

Section ID: text-id-27437884-3

4.Category d—Fire barriers with 1-hour but less than 2-hour fire-resistance ratings constructed in accordance with Section 707 of the International Building Code and floor assemblies with 2-hour or greater fire-resistance ratings constructed in accordance with Section 711 of the International Building Code.

Section ID: text-id-27437884-4

5.Category e—Fire barriers and floor assemblies with 2-hour or greater fire-resistance ratings and constructed in accordance with Sections 707 and 711 of the International Building Code, respectively.

Section ID: text-id-27437884-5

Evaluate the fire-resistance rating and degree of completeness of walls which create corridors serving the floor and that are constructed in accordance with Section 1020 of the International

Building Code. This evaluation shall not include the wall elements considered under Sections 1301.6.3 and 1301.6.4. Under the categories and groups in Table 1301.6.5, determine the appropriate value and enter that value into Table 1301.7 under Safety Parameter 1301.6.5, Corridor Walls, for fire safety, means of egress and general safety.

Section ID: text-id-27437887-0

TABLE 1301.6.5

Section ID: text-id-27437888-0

CORRIDOR WALL VALUES

Section ID: text-id-27437888-1

a. Corridors not providing at least one-half the exit access travel distance for all occupants on a floor shall use Category b.

Section ID: text-id-27437921-0

The categories for corridor walls are:

Section ID: text-id-27437922-0

1.Category a—No fire partitions; incomplete fire partitions; no doors; or doors not self-closing.

Section ID: text-id-27437922-1

2.Category b—Less than 1-hour fire-resistance rating or not constructed in accordance with Section 708.4 of the International Building Code.

Section ID: text-id-27437922-2

3.Category c—1-hour to less than 2-hour fire-resistance rating, with doors conforming to Section 716 of the International Building Code or corridors as permitted by Section 1020 of the International Building Code to be without a fire-resistance rating.

Section ID: text-id-27437922-3

4.Category d—2-hour or greater fire-resistance rating, with doors conforming to Section 716 of the International Building Code.

Section ID: text-id-27437922-4

Evaluate the fire-resistance rating of interior exit stairways or ramps, hoistways, escalator openings and other shaft enclosures within the building, and openings between two or more floors. Table 1301.6.6(1) contains the appropriate protection values. Multiply that value by the construction-type factor found in Table 1301.6.6(2). Enter the vertical opening value and its sign (positive or negative) in Table 1301.7 under Safety Parameter 1301.6.6, Vertical Openings, for fire safety, means of egress and general safety. If the structure is a one-story building or if all the unenclosed vertical openings within the building conform to the requirements of Section 712 of the International Building Code, enter a value of 2. The maximum positive value for this requirement (VO) shall be 2.

Section ID: text-id-27437925-0

TABLE 1301.6.6(1)

Section ID: text-id-27437926-0

VERTICAL OPENING PROTECTION VALUE

Section ID: text-id-27437926-1

TABLE 1301.6.6(2)

Section ID: text-id-27437939-0

CONSTRUCTION-TYPE FACTOR

Section ID: text-id-27437939-1

The following formula shall be used in computing vertical opening value.

Section ID: text-id-27437962-0

where:

Section ID: text-id-27437962-1

VO = Vertical opening value. The calculated value shall not be greater than positive 2.0.

Section ID: text-id-27437962-2

PV = Protection value from Table 1301.6.6(1).

Section ID: text-id-27437962-3

CF = Construction-type factor from Table 1301.6.6(2).

Section ID: text-id-27437962-4

Evaluate the ability of the HVAC system to resist the movement of smoke and fire beyond the point of origin. Under the categories in Section 1301.6.7.1, determine the appropriate value and enter that value into Table 1301.7 under Safety Parameter 1301.6.7, HVAC Systems, for fire safety, means of egress and general safety. Facilities in Group I-2 occupancies meeting Category a, b or c shall be considered to fail the evaluation.

Section ID: text-id-27437965-0

The categories for HVAC systems are:

Section ID: text-id-27437966-0

1.Category a—Plenums not in accordance with Section 602 of the International Mechanical Code. -10 points.

Section ID: text-id-27437966-1

2.Category b—Air movement in egress elements not in accordance with Section 1020.6 of the International Building Code. -5 points.

Section ID: text-id-27437966-2

3.Category c—Both Categories a and b are applicable. -15 points.

Section ID: text-id-27437966-3

4.Category d—Compliance of the HVAC system with Section 1020.6 of the International Building Code and Section 602 of the International Mechanical Code. 0 points.

Section ID: text-id-27437966-4

5.Category e—Systems serving one story; or a central boiler/chiller system without ductwork connecting two or more stories or where systems have no ductwork. +5 points.

Section ID: text-id-27437966-5

Evaluate the smoke detection capability based on the location and operation of automatic fire detectors in accordance with the International Mechanical Code and Section 907 of the International Building Code. Under the categories and occupancies in Table 1301.6.8, determine the appropriate value and enter that value into Table 1301.7 under Safety Parameter 1301.6.8, Automatic Fire Detection, for fire safety, means of egress and general safety. Facilities in Group I-2 occupancies meeting Category a, b or c shall be considered to fail the evaluation.

Section ID: text-id-27437969-0

TABLE 1301.6.8

Section ID: text-id-27437970-0

AUTOMATIC FIRE DETECTION VALUES

Section ID: text-id-27437970-1

NA = Not Applicable.

Section ID: text-id-27438008-0

NP = Not Permitted.

Section ID: text-id-27438008-1

The categories for automatic fire detection are:

Section ID: text-id-27438009-0

1.Category a—None.

Section ID: text-id-27438009-1

2.Category b—Existing smoke detectors in HVAC systems and maintained in accordance with the International Fire Code.

Section ID: text-id-27438009-2

3.Category c—Smoke detectors in HVAC systems. The detectors are installed in accordance with the requirements for new buildings in the International Mechanical Code.

Section ID: text-id-27438009-3

4.Category d—Smoke detectors throughout all floor areas other than individual sleeping units, tenant spaces and dwelling units.

Section ID: text-id-27438009-4

5.Category e—Smoke detectors installed throughout the floor area.

Section ID: text-id-27438009-5

6.Category f—Smoke detectors in corridors only.

Section ID: text-id-27438009-6

Evaluate the capability of the fire alarm system in accordance with Section 907 of the International Building Code. Under the categories and occupancies in Table 1301.6.9, determine the appropriate value and enter that value into Table 1301.7 under Safety Parameter 1301.6.9, Fire Alarm System, for fire safety, means of egress and general safety.

Section ID: text-id-27438012-0

TABLE 1301.6.9

Section ID: text-id-27438013-0

FIRE ALARM SYSTEM VALUES

Section ID: text-id-27438013-1

a. For buildings equipped throughout with an automatic sprinkler system, add 2 points for activation by a sprinkler water-flow device.

Section ID: text-id-27438036-0

The categories for fire alarm systems are:

Section ID: text-id-27438037-0

1.Category a—None.

Section ID: text-id-27438037-1

2.Category b—Fire alarm system with manual fire alarm boxes in accordance with Section 907.4 of the International Building Code and alarm notification appliances in accordance with Section 907.5.2 of the International Building Code.

Section ID: text-id-27438037-2

3.Category c—Fire alarm system in accordance with Section 907 of the International Building Code.

Section ID: text-id-27438037-3

4.Category d—Category c plus a required emergency voice/alarm communications system and a fire command station that conforms to Section 911 of the International Building Code and contains the emergency voice/alarm communications system controls, fire department communication system controls, and any other controls specified in Section 911 of the International Building Code where those systems are provided.

Section ID: text-id-27438037-4

Evaluate the ability of a natural or mechanical venting, exhaust or pressurization system to control the movement of smoke from a fire. Under the categories and occupancies in Table 1301.6.10, determine the appropriate value and enter that value into Table 1301.7 under Safety Parameter 1301.6.10, Smoke Control, for means of egress and general safety.

Section ID: text-id-27438040-0

TABLE 1301.6.10

Section ID: text-id-27438041-0

SMOKE CONTROL VALUES

Section ID: text-id-27438041-1

a. This value shall be 0 if compliance with Category d or e in Section 1301.6.8.1 has not been obtained.

Section ID: text-id-27438086-0

The categories for smoke control are:

Section ID: text-id-27438087-0

1.Category a—None.

Section ID: text-id-27438087-1

2.Category b—The building is equipped throughout with an automatic sprinkler system. Openings are provided in exterior walls at the rate of 20 square feet (1.86 m2) per 50 linear feet (15 240 mm) of exterior wall in each story and distributed around the building perimeter at intervals not exceeding 50 feet (15 240 mm). Such openings shall be readily openable from the inside without a key or separate tool and shall be provided with ready access thereto. In lieu of operable openings, clearly and permanently marked tempered glass panels shall be used.

Section ID: text-id-27438087-2

3.Category c—One enclosed exit stairway, with ready access thereto, from each occupied floor of the building. The stairway has operable exterior windows, and the building has openings in accordance with Category b.

Section ID: text-id-27438087-3

4.Category d—One smokeproof enclosure and the building has openings in accordance with Category b.

Section ID: text-id-27438087-4

5.Category e—The building is equipped throughout with an automatic sprinkler system. Each floor area is provided with a mechanical air-handling system designed to accomplish smoke containment. Return and exhaust air shall be moved directly to the outside without recirculation to other floor areas of the building under fire conditions. The system shall exhaust not less than six air changes per hour from the floor area. Supply air by mechanical means to the floor area is not required. Containment of smoke shall be considered as confining smoke to the floor area involved without migration to other floor areas. Any other tested and approved design that will adequately accomplish smoke containment is permitted.

Section ID: text-id-27438087-5

6.Category f—Each stairway shall be one of the following: a smokeproof enclosure in accordance with Section 1023.12 of the International Building Code; pressurized in accordance with Section 909.20.5 of the International Building Code; or shall have operable exterior windows.

Section ID: text-id-27438087-6

Evaluate the means of egress capacity and the number of exits available to the building occupants. In applying this section, the means of egress are required to conform to the following sections of the International Building Code: 1003.7, 1004, 1005, 1006, 1007, 1016.2, 1026.1, 1028.3, 1028.5, 1030.2, 1030.3, 1030.4 and 1031. The number of exits credited is the number that is available to each occupant of the area being evaluated. Existing fire escapes shall be accepted as a component in the means of egress when conforming to Section 504.

Section ID: text-id-27438090-0

Under the categories and occupancies in Table 1301.6.11, determine the appropriate value and enter that value into Table 1301.7 under Safety Parameter 1301.6.11, Means of Egress Capacity, for means of egress and general safety.

Section ID: text-id-27438090-1

TABLE 1301.6.11

Section ID: text-id-27438091-0

MEANS OF EGRESS VALUES

Section ID: text-id-27438091-1

a. The values indicated are for buildings six stories or less in height. For buildings over six stories above grade plane, add an additional -10 points.

Section ID: text-id-27438124-0

The categories for means-ofegress capacity and number of exits are:

Section ID: text-id-27438125-0

1.Category a—Compliance with the minimum required means-of-egress capacity or number of exits is achieved through the use of a fire escape in accordance with Section 405.

Section ID: text-id-27438125-1

2.Category b—Capacity of the means of egress complies with Section 1005 of the International Building Code, and the number of exits complies with the minimum number required by Section 1006 of the International Building Code.

Section ID: text-id-27438125-2

3.Category c—Capacity of the means of egress is equal to or exceeds 125 percent of the required means-of-egress capacity, the means of egress complies with the minimum required width dimensions specified in the International Building Code, and the number of exits complies with the minimum number required by Section 1006 of the International Building Code.

Section ID: text-id-27438125-3

4.Category d—The number of exits provided exceeds the number of exits required by Section 1006 of the International Building Code. Exits shall be located a distance apart from each other equal to not less than that specified in Section 1007 of the International Building Code.

Section ID: text-id-27438125-4

5.Category e—The area being evaluated meets both Categories c and d.

Section ID: text-id-27438125-5

In spaces required to be served by more than one means of egress, evaluate the length of the exit access travel path in which the building occupants are confined to a single path of travel. Under the categories and occupancies in Table 1301.6.12, determine the appropriate value and enter that value into Table 1301.7 under Safety Parameter 1301.6.12, Dead Ends, for means of egress and general safety.

Section ID: text-id-27438128-0

TABLE 1301.6.12

Section ID: text-id-27438129-0

DEAD-END VALUES

Section ID: text-id-27438129-1

a. For dead-end distances between categories, the dead-end value shall be obtained by linear interpolation.

Section ID: text-id-27438152-0

The categories for dead ends are:

Section ID: text-id-27438153-0

1.Category a—Dead end of 35 feet (10 670 mm) in nonsprinklered buildings or 70 feet (21 340 mm) in sprinklered buildings.

Section ID: text-id-27438153-1

2.Category b—Dead end of 20 feet (6096 mm); or 50 feet (15 240 mm) in Group B in accordance with Section 1020.5, Exception 2, of the International Building Code.

Section ID: text-id-27438153-2

3.Category c—No dead ends; or ratio of length to width (l/w) is less than 2.5:1.

Section ID: text-id-27438153-3

4.Category d—Dead ends exceeding Category a.

Section ID: text-id-27438153-4

Evaluate the length of exit access travel to an approved exit. Determine the appropriate points in accordance with the following equation and enter that value into Table 1301.7 under Safety Parameter 1301.6.13, Maximum Exit Access Travel Distance for means of egress and general safety. The maximum allowable exit access travel distance shall be determined in accordance with Section 1017.1 of the International Building Code.

Section ID: text-id-27438156-0

Evaluate the passenger elevator equipment and controls that are available to the fire department to reach all occupied floors. Emergency recall and in-car operation of elevators shall be provided in accordance with the International Fire Code. Under the categories and occupancies in Table 1301.6.14, determine the appropriate value and enter that value into Table 1301.7 under Safety Parameter 1301.6.14, Elevator Control, for fire safety, means of egress and general safety. The values shall be zero for a single-story building.

Section ID: text-id-27438158-0

TABLE 1301.6.14

Section ID: text-id-27438159-0

ELEVATOR CONTROL VALUES

Section ID: text-id-27438159-1

For SI: 1 foot = 304.8 mm.

Section ID: text-id-27438177-0

NP = Not Permitted.

Section ID: text-id-27438177-1

The categories for elevator controls are:

Section ID: text-id-27438178-0

1.Category a—No elevator.

Section ID: text-id-27438178-1

2.Category b—Any elevator without Phase I emergency recall operation and Phase II emergency in-car operation.

Section ID: text-id-27438178-2

3.Category c—All elevators with Phase I emergency recall operation and Phase II emergency in-car operation as required by the International Fire Code.

Section ID: text-id-27438178-3

4.Category d—All meet Category c; or Category b where permitted to be without Phase I emergency recall operation and Phase II emergency in-car operation; and at least one elevator that complies with new construction requirements serves all occupied floors.

Section ID: text-id-27438178-4

Evaluate the presence of and reliability of means of egress emergency lighting. Under the categories and occupancies in Table 1301.6.15, determine the appropriate value and enter that value into Table 1301.7 under Safety Parameter 1301.6.15, Means of Egress Emergency Lighting, for means of egress and general safety.

Section ID: text-id-27438181-0

TABLE 1301.6.15

Section ID: text-id-27438182-0

MEANS OF EGRESS EMERGENCY LIGHTING VALUES

Section ID: text-id-27438182-1

NP = Not Permitted.

Section ID: text-id-27438197-0

The categories for means of egress emergency lighting are:

Section ID: text-id-27438198-0

1.Category a—Means-of-egress lighting and exit signs not provided with emergency power in accordance with Section 2702 of the International Building Code.

Section ID: text-id-27438198-1

2.Category b—Means of egress lighting and exit signs provided with emergency power in accordance with Section 2702 of the International Building Code.

Section ID: text-id-27438198-2

3.Category c—Emergency power provided to means of egress lighting and exit signs, which provides protection in the event of power failure to the site or building.

Section ID: text-id-27438198-3

Where a building has two or more occupancies that are not in the same occupancy classification, the separation between the mixed occupancies shall be evaluated in accordance with this section. Where there is no separation between the mixed occupancies or the separation between mixed occupancies does not qualify for any of the categories indicated in Section 1301.6.16.1, the building shall be evaluated as indicated in Section 1301.6, and the value for mixed occupancies shall be zero. Under the categories and occupancies in Table 1301.6.16, determine the appropriate value and enter that value into Table 1301.7 under Safety Parameter 1301.6.16,

Mixed Occupancies, for fire safety and general safety. For buildings without mixed occupancies, the value shall be zero. Facilities in Group I-2 occupancies meeting Category a shall be considered to fail the evaluation.

Section ID: text-id-27438201-0

TABLE 1301.6.16

Section ID: text-id-27438202-0

MIXED OCCUPANCY VALUESa

Section ID: text-id-27438202-1

NP = Not Permitted.

Section ID: text-id-27438221-0

a.For fire-resistance ratings between categories, the value shall be obtained by linear interpolation.

Section ID: text-id-27438221-1

The categories for mixed occupancies are:

Section ID: text-id-27438222-0

1.Category a—Occupancies separated by minimum 1-hour fire barriers or minimum 1-hour horizontal assemblies, or both.

Section ID: text-id-27438222-1

2.Category b—Separations between occupancies in accordance with Section 508.4 of the International Building Code.

Section ID: text-id-27438222-2

3.Category c—Separations between occupancies having a fire-resistance rating of not less than twice that required by Section 508.4 of the International Building Code.

Section ID: text-id-27438222-3

Evaluate the ability to suppress or control a fire based on the installation of an automatic sprinkler system in accordance with Section 903.3.1 of the International Building Code. “Required sprinklers” shall be based on the requirements of the International Building Code. Under the categories and occupancies in Table 1301.6.17, determine the appropriate value and enter that value into Table 1301.7 under Safety Parameter 1301.6.17, Automatic Sprinklers, for fire safety, means of egress divided by 2, and general safety. High-rise buildings defined in Chapter 2 of the International Building Code that undergo a change of occupancy to Group R shall be equipped throughout with an automatic sprinkler system in accordance with Section 403 of the International Building Code and Chapter 9 of the International Building Code. Facilities in Group I-2 occupancies meeting Category a, b, c or f shall be considered to fail the evaluation.

Section ID: text-id-27438225-0

TABLE 1301.6.17

Section ID: text-id-27438226-0

SPRINKLER SYSTEM VALUES

Section ID: text-id-27438226-1

NP = Not Permitted.

Section ID: text-id-27438264-0

a.These options cannot be taken if Category a in Section 1301.6.18 is used.

Section ID: text-id-27438264-1

The categories for automatic sprinkler system protection are:

Section ID: text-id-27438265-0

1.Category a— An approved automatic sprinkler system is required throughout; an approved automatic sprinkler system is not provided.

Section ID: text-id-27438265-1

2.Category b—An approved automatic sprinkler system is required in a portion of a building; an approved automatic sprinkler system is not provided; the sprinkler system design is not adequate for the hazard protected in accordance with Chapter 9 of the International Building Code.

Section ID: text-id-27438265-2

3.Category c—An approved automatic sprinkler system is not required; none are provided.

Section ID: text-id-27438265-3

4.Category d—An approved automatic sprinkler system is required in a portion of a building; an approved automatic sprinkler system is provided in a portion of a building in accordance with Chapter 9 of the International Building Code.

Section ID: text-id-27438265-4

5.Category e—An approved automatic sprinkler system is required throughout; an approved automatic sprinkler system is provided throughout in accordance with Chapter 9 of the International Building Code.

Section ID: text-id-27438265-5

6.Category f—An approved automatic sprinkler system is not required throughout; an approved automatic sprinkler system is provided throughout in accordance with Chapter 9 of the International Building Code.

Section ID: text-id-27438265-6

Evaluate the ability to initiate attack on a fire by making a supply of water readily available through the installation of standpipes in accordance with Section 905 of the International Building Code. “Required Standpipes” shall be based on the requirements of the International Building Code. Under the categories and occupancies in Table 1301.6.18, determine the appropriate value and enter that value into Table 1301.7 under Safety Parameter 1301.6.18, Standpipes, for fire safety, means of egress and general safety.

Section ID: text-id-27438268-0

TABLE 1301.6.18

Section ID: text-id-27438269-0

STANDPIPE SYSTEM VALUES

Section ID: text-id-27438269-1

a.This option cannot be taken if Category a or Category b in Section 1301.6.17 is used.

Section ID: text-id-27438297-0

The categories for standpipe systems are:

Section ID: text-id-27438298-0

1.Category a—Standpipes are required; standpipe is not provided or the standpipe system design is not in compliance with Section 905.3 of the International Building Code.

Section ID: text-id-27438298-1

2.Category b—Standpipes are not required; none are provided.

Section ID: text-id-27438298-2

3.Category c—Standpipes are required; standpipes are provided in accordance with Section 905 of the International Building Code.

Section ID: text-id-27438298-3

4.Category d—Standpipes are not required; standpipes are provided in accordance with Section 905 of the International Building Code.

Section ID: text-id-27438298-4

Evaluate the protection of incidental uses in accordance with Section 509.4.2 of the International Building Code. Do not include those where this code requires automatic sprinkler systems throughout the building including covered and open mall buildings, high-rise buildings, public garages and unlimited area buildings. Assign the lowest score from Table 1301.6.19 for the building or floor area being evaluated and enter that value into Table 1301.7 under Safety Parameter 1301.6.19, Incidental Uses, for fire safety, means of egress and general safety. If there are no specific occupancy areas in the building or floor area being evaluated, the value shall be zero.

Section ID: text-id-27438301-0

TABLE 1301.6.19

Section ID: text-id-27438302-0

INCIDENTAL USE AREA VALUES

Section ID: text-id-27438302-1

AS = Automatic Sprinkler System.

Section ID: text-id-27438369-0

CRS = Construction capable of resisting the passage of smoke (see Section 509.4.2 of the International Building Code).

Section ID: text-id-27438369-1

Evaluate the smoke compartments for compliance with Section 407.5 of the International Building Code. Under the categories and occupancies in Table 1301.6.20, determine the appropriate smoke compartmentation value (SCV) and enter that value into Table 1301.7 under Safety Parameter 1301.6.20, Smoke Compartmentation, for fire safety, means of egress and general safety. Facilities in Group I-2 occupancies meeting Category b or c shall be considered to fail the evaluation.

Section ID: text-id-27438371-0

TABLE 1301.6.20

Section ID: text-id-27438372-0

SMOKE COMPARTMENTATION VALUES

Section ID: text-id-27438372-1

NP = Not Permitted.

Section ID: text-id-27438387-0

a.For areas between categories, the smoke compartmentation value shall be obtained by linear interpolation.

Section ID: text-id-27438387-1

Categories for smoke compartment size are:

Section ID: text-id-27438388-0

1.Category a—Smoke compartment complies with Section 407.5 of the International Building Code.

Section ID: text-id-27438388-1

2.Category b—Smoke compartment are provided but do not comply with Section 407.5 of the International Building Code.

Section ID: text-id-27438388-2

3.Category c—Smoke compartments are not provided.

Section ID: text-id-27438388-3

In I-2 occupancies, the ability of care recipients, their concentration and ratio to attendants shall be evaluated and applied in accordance with this section. Evaluate each smoke compartment using the categories in Sections 1301.6.21.1, 1301.6.21.2 and 1301.6.21.3 and enter the value in Table 1301.7. To determine the safety factor, multiply the three values together; if the product is less than 6, compliance has failed.

Section ID: text-id-27438391-0

Evaluate the ability of the care recipients for self-preservation in each smoke compartment in an emergency. Under the categories and occupancies in Table 1301.6.21.1, determine the appropriate value and enter that value in Table 1301.7 under Safety Parameter 1301.6.21.1, Care Recipient Ability for Self-preservation, for means of egress and general safety.

Section ID: text-id-27438392-0

TABLE 1301.6.21.1

Section ID: text-id-27438393-0

CARE RECIPIENT ABILITY VALUES

Section ID: text-id-27438393-1

The categories for care recipient ability for self-preservation are:

Section ID: text-id-27438405-0

1.Category a—(mobile) Care recipients are capable of self-preservation without assistance.

Section ID: text-id-27438405-1

2.Category b—(not mobile) Care recipients rely on assistance for evacuation or relocation.

Section ID: text-id-27438405-2

3.Category c—(not movable) Care recipients cannot be evacuated or relocated.

Section ID: text-id-27438405-3

Evaluate the concentration of care recipients in each smoke compartment under Section 1301.6.21.2. Under the categories and occupancies in Table 1301.6.21.2 determine the appropriate value and enter that value in Table 1301.7 under Safety Parameter 1301.6.21.2, Care Recipient Concentration, for means of egress and general safety.

Section ID: text-id-27438408-0

TABLE 1301.6.21.2

Section ID: text-id-27438409-0

CARE RECIPIENT CONCENTRATION VALUES

Section ID: text-id-27438409-1

The categories for care recipient concentration are:

Section ID: text-id-27438421-0

1.Category a—smoke compartment has 1 to 10 care recipients.

Section ID: text-id-27438421-1

2.Category b—smoke compartment has more than 10 to 40 care recipients.

Section ID: text-id-27438421-2

3.Category c—smoke compartment has more than 40 care recipients.

Section ID: text-id-27438421-3

Evaluate the attendant-to-care recipients ratio for each compartment under Section 1301.6.21.3. Under the categories and occupancies in Table 1301.6.21.3 determine the appropriate value and enter that value in Table 1301.7 under Safety Parameter 1301.6.21.3, Attendant-to-Care Recipients Ratio, for means of egress and general safety.

Section ID: text-id-27438424-0

TABLE 1301.6.21.3

Section ID: text-id-27438425-0

ATTENDANT-TO-CARE RECIPIENTS RATIO VALUES

Section ID: text-id-27438425-1

The categories for attendant-to-care recipient concentrations are:

Section ID: text-id-27438437-0

1.Category a—attendant-to-care recipients concentration is 1:5 or no care recipients.

Section ID: text-id-27438437-1

2.Category b—attendant-to-care recipients concentration is 1:6 to 1:10.

Section ID: text-id-27438437-2

3.Category c—attendant-to-care recipients concentration is greater than 1:10.

Section ID: text-id-27438437-3

After determining the appropriate data from Section 1301.6, enter those data in Table 1301.7 and total the building score.

Section ID: text-id-27438442-0

TABLE 1301.7

Section ID: text-id-27438443-0

SUMMARY SHEET—BUILDING CODE

Section ID: text-id-27438443-1

* * * *No applicable value to be inserted.

Section ID: text-id-27438593-0

a.Only applicable to Group I-2 occupancies.

Section ID: text-id-27438593-1

The values in Table 1301.8 are the required mandatory safety scores for the evaluation process listed in Section 1301.6.

Section ID: text-id-27438595-0

TABLE 1301.8

Section ID: text-id-27438596-0

MANDATORY SAFETY SCORESa

Section ID: text-id-27438596-1

a.MFS = Mandatory Fire Safety.

Section ID: text-id-27438646-0

MME = Mandatory Means of Egress.

Section ID: text-id-27438646-1

MGS = Mandatory General Safety.

Section ID: text-id-27438646-2

The mandatory safety score in Table 1301.8 shall be subtracted from the building score in Table 1301.7 for each category in accordance with the evaluation formulas in Table 1301.9. Where the final score for any category equals zero or more, the building is in compliance with the requirements of this section for that category. Where the final score for any category is less than zero, the building is not in compliance with the requirements of this section.

Section ID: text-id-27438648-0

TABLE 1301.9

Section ID: text-id-27438649-0

EVALUATION FORMULASa

Section ID: text-id-27438649-1

For mixed occupancies, the following provisions shall apply:

Section ID: text-id-27438680-0

1.Where the separation between mixed occupancies does not qualify for any category indicated in Section 1301.6.16, the mandatory safety scores for the occupancy with the lowest general safety score in Table 1301.8 shall be utilized (see Section 1301.6).

Section ID: text-id-27438680-1

2.Where the separation between mixed occupancies qualifies for any category indicated in Section 1301.6.16, the mandatory safety scores for each occupancy shall be placed against the evaluation scores for the appropriate occupancy. An evaluation is not required for areas of the building with separated occupancies in accordance with Table 508.4 of the International Building Code in which there are no alterations or change of occupancy.

Section ID: text-id-27438680-2

CHAPTER 14 RELOCATED OR MOVED BUILDINGS

Section ID: text-id-27438685 | Section Number: 27438685

User Note: User note:About this chapter: Chapter 14 is applicable to any building that is moved or relocat

User note:

Section ID: text-id-27438685-0

About this chapter: Chapter 14 is applicable to any building that is moved or relocated. The relocation of a building will automatically cause an inspection and evaluation process that enables the jurisdiction to determine the level of compliance with the International Fire Code® and the International Property Maintenance Code®. These two codes, by their scope, are applicable to existing buildings. This is the case regardless of any repair, remodeling, alteration work or change of occupancy occurring (see the International Fire Code and International Property Maintenance Code).

Section ID: text-id-27438685-1

This chapter provides requirements for relocated or moved structures, including relocatable buildings as defined in Chapter 2.

Section ID: text-id-27438687-0

Relocated or moved bleachers, grandstands and folding and telescopic seating shall comply with ICC 300.

Section ID: text-id-27438688-0

The building shall be safe for human occupancy as determined by the International Fire Code and the International Property Maintenance Code. Any repair, alteration or change of occupancy undertaken within the moved structure shall comply with the requirements of this code applicable to the work being performed. Any field-fabricated elements shall comply with the requirements of the International Building Code or the International Residential Code, as applicable.

Section ID: text-id-27438691-0

The building shall be located on the lot in accordance with the requirements of the International Building Code or the International Residential Code as applicable.

Section ID: text-id-27438695-0

The foundation system of relocated buildings shall comply with the International Building Code or the International Residential Code as applicable.

Section ID: text-id-27438697-0

The connection of the relocated building to the foundation shall comply with the International Building Code or the International Residential Code, as applicable.

Section ID: text-id-27438698-0

Buildings shall comply with International Building Code or International Residential Code wind provisions, as applicable.

Section ID: text-id-27438701-0

Exceptions:

Section ID: text-id-27438701-1

1.Detached one- and two-family dwellings and Group U occupancies where wind loads at the new location are not higher than those at the previous location.

Section ID: text-id-27438701-2

2.Structural elements whose stress is not increased by more than 10 percent.

Section ID: text-id-27438701-3

Buildings shall comply with International Building Code or International Residential Code seismic provisions at the new location, as applicable.

Section ID: text-id-27438703-0

Exceptions:

Section ID: text-id-27438703-1

1.Structures in Seismic Design Categories A and B and detached one- and two-family dwellings in Seismic Design Categories A, B and C where the seismic loads at the new location are not higher than those at the previous location.

Section ID: text-id-27438703-2

2.Structural elements whose stress is not increased by more than 10 percent.

Section ID: text-id-27438703-3

Structures shall comply with International Building Code or International Residential Code snow loads, as applicable, where snow loads at the new location are higher than those at the previous location.

Section ID: text-id-27438705-0

Exception: Structural elements whose stress is not increased by more than 5 percent.

Section ID: text-id-27438705-1

If relocated or moved into a flood hazard area, structures shall comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

Section ID: text-id-27438707-0

The code official shall be authorized to inspect, or to require approved professionals to inspect at the expense of the owner, the various structural parts of a relocated building to verify that structural components and connections have not sustained structural damage. Any repairs required by the code official as a result of such inspection shall be made prior to the final approval.

Section ID: text-id-27438709-0

CHAPTER 15 CONSTRUCTION SAFEGUARDS

Section ID: text-id-27438713 | Section Number: 27438713

User Note: User note:About this chapter: Chapter 15 looks to the construction process. Parameters are p

User note:

Section ID: text-id-27438713-0

About this chapter: Chapter 15 looks to the construction process. Parameters are provided for demolition and for protecting adjacent property during demolition and construction. Issues such as how to provide egress and adequate water supply while the building is growing, the timing of standpipe and sprinkler installation, and protection of pedestrians are addressed. Note that this chapter is consistent with Chapter 33 of the International Building Code and Chapter 33 of the International Fire Code.

Section ID: text-id-27438713-1

The provisions of this chapter shall govern safety during construction and the protection of adjacent public and private properties.

Section ID: text-id-27438715-0

Construction equipment and materials shall be stored and placed so as not to endanger the public, the workers or adjoining property for the duration of the construction project.

Section ID: text-id-27438717-0

Structural roof components shall be capable of supporting the roof-covering system and the material and equipment loads that will be encountered during installation of the system.

Section ID: text-id-27438718-0

Required exits, existing structural elements, fire protection devices and sanitary safeguards shall be maintained at all times during alterations, repairs or additions to any building or structure.

Section ID: text-id-27438721-0

Exceptions:

Section ID: text-id-27438721-1

1.Where such required elements or devices are being altered or repaired, adequate substitute provisions shall be made.

Section ID: text-id-27438721-2

2.Maintenance of such elements and devices is not required where the existing building is not occupied.

Section ID: text-id-27438721-3

Waste materials shall be removed in a manner that prevents injury or damage to persons, adjoining properties and public rights-of-way.

Section ID: text-id-27438723-0

Fire safety during construction shall comply with the applicable requirements of the International Building Code and the applicable provisions of Chapter 33 of the International Fire Code.

Section ID: text-id-27438725-0

Pedestrians shall be protected during construction and demolition activities as required by Sections 1501.6.1 through 1501.6.7 and Table 1501.6. Signs shall be provided to direct pedestrian traffic.

Section ID: text-id-27438727-0

[BS] TABLE 1501.6

Section ID: text-id-27438728-0

PROTECTION OF PEDESTRIANS

Section ID: text-id-27438728-1

For SI: 1 foot = 304.8 mm.

Section ID: text-id-27438747-0

A walkway shall be provided for pedestrian travel in front of every construction and demolition site unless the applicable governing authority authorizes the sidewalk to be fenced or closed. A walkway shall be provided for pedestrian travel that leads from a building entrance or exit of an occupied structure to a public way. Walkways shall be of sufficient width to accommodate the pedestrian traffic, but shall be not less than 4 feet (1219 mm) in width. Walkways shall be provided with a durable walking surface and shall be accessible in accordance with Chapter 11 of the International Building Code. Walkways shall be designed to support all imposed loads and the design live load shall be not less than 150 pounds per square foot (psf) (7.2 kN/m2).

Section ID: text-id-27438748-0

Pedestrian traffic shall be protected by a directional barricade where the walkway extends into the street. The directional barricade shall be of sufficient size and construction to direct vehicular traffic away from the pedestrian path.

Section ID: text-id-27438750-0

Construction railings shall be not less than 42 inches (1067 mm) in height and shall be sufficient to direct pedestrians around construction areas.

Section ID: text-id-27438752-0

Barriers shall be not less than 8 feet (2438 mm) in height and shall be placed on the side of the walkway nearest the construction. Barriers shall extend the entire length of the construction site. Openings in such barriers shall be protected by doors that are normally kept closed.

Section ID: text-id-27438754-0

Barriers shall be designed to resist loads required in Chapter 16 of the International Building Code unless constructed as follows:

Section ID: text-id-27438755-0

1.Barriers shall be provided with 2-inch by 4-inch (51 mm by 102 mm) top and bottom plates.

Section ID: text-id-27438755-1

2.The barrier material shall be boards not less than 3/4 inch (19.1 mm) in thickness or wood structural use panels not less than 1/4 inch (6.4 mm) in thickness.

Section ID: text-id-27438755-2

3.Wood structural use panels shall be bonded with an adhesive identical to that for exterior wood structural use panels.

Section ID: text-id-27438755-3

4.Wood structural use panels 1/4inch (6.4 mm) or 15/16 inch (23.8 mm) in thickness shall have studs spaced not more than 2 feet (610 mm) on center.

Section ID: text-id-27438755-4

5.Wood structural use panels 3/8 inch (9.5 mm) or 1/2 inch (12.7 mm) in thickness shall have studs spaced not more than 4 feet (1219 mm) on center, provided that a 2-inch by 4-inch (51 mm by 102 mm) stiffener is placed horizontally at mid-height where the stud spacing is greater than 2 feet (610 mm) on center.

Section ID: text-id-27438755-5

6.Wood structural use panels 5/8 inch (15.9 mm) or thicker shall not span over 8 feet (2438 mm).

Section ID: text-id-27438755-6

Covered walkways shall have a clear height of not less than 8 feet (2438 mm) as measured from the floor surface to the canopy overhead. Adequate lighting shall be provided at all times. Covered walkways shall be designed to support all imposed loads. The design live load shall be not less than150 psf (7.2 kN/m2) for the entire structure.

Section ID: text-id-27438758-0

Exception: Roofs and supporting structures of covered walkways for new, light-frame construction not exceeding two stories above grade plane are permitted to be designed for a live load of 75 psf (3.6 kN/m2) or the loads imposed on them, whichever is greater. In lieu of such designs, the roof and supporting structure of a covered walkway are permitted to be constructed as follows:

Section ID: text-id-27438758-1

1.Footings shall be continuous 2-inch by 6-inch (51 mm by 152 mm) members.

Section ID: text-id-27438758-2

2.Posts not less than 4 inches by 6 inches (102 mm by 152 mm) shall be provided on both sides of the roof and spaced not more than 12 feet (3658 mm) on center.

Section ID: text-id-27438758-3

3.Stringers not less than 4 inches by 12 inches (102 mm by 305 mm) shall be placed on edge on the posts.

Section ID: text-id-27438758-4

4.Joists resting on the stringers shall be not less than 2 inches by 8 inches (51 mm by 203 mm) and shall be spaced not more than 2 feet (610 mm) on center.

Section ID: text-id-27438758-5

5.The deck shall be planks not less than 2 inches (51 mm) thick or wood structural panels with an exterior exposure durability classification not less than 23/32 inch (18.3 mm) thick nailed to the

joists.

Section ID: text-id-27438758-6

6.Each post shall be knee-braced to joists and stringers by members not less than 2 inches by 4 inches (51 mm by 102 mm); 4 feet (1219 mm) in length.

Section ID: text-id-27438758-7

7.A curb that is not less than 2 inches by 4 inches (51 mm by 102 mm) shall be set on edge along the outside edge of the deck.

Section ID: text-id-27438758-8

Pedestrian protection required by Section 1501.6 shall be maintained in place and kept in good order for the entire length of time pedestrians are subject to being endangered. The owner or the owner’s authorized agent, on completion of the construction activity, shall immediately remove walkways, debris and other obstructions and leave such public property in as good a condition as it was before such work was commenced.

Section ID: text-id-27438760-0

Every excavation on a site located 5 feet (1524 mm) or less from the street lot line shall be enclosed with a barrier not less than 6 feet (1829 mm) in height. Where located more than 5 feet(1524 mm) from the street lot line, a barrier shall be erected where required by the code official. Barriers shall be of adequate strength to resist wind pressure as specified in Chapter 16 of the International Building Code.

Section ID: text-id-27438762-0

Sanitary facilities shall be provided during construction or demolition activities in accordance with the International Plumbing Code.

Section ID: text-id-27438765-0

Adjoining public and private property shall be protected from damage during construction and demolition work. Protection must be provided for footings, foundations, party walls, chimneys, skylights and roofs. Provisions shall be made to control water runoff and erosion during construction or demolition activities. The person making or causing an excavation to be made shall provide written notice to the owners of adjoining buildings advising them that the excavation is to be made and that the adjoining buildings should be protected. Said notification shall be delivered not less than 10 days prior to the scheduled starting date of the excavation.

Section ID: text-id-27438769-0

Where a retention system is used to provide support of an excavation for protection of adjacent structures, the system shall conform to the requirements in Section 1502.2.1 through 1502.2.3.

Section ID: text-id-27438771-0

Excavation retention systems shall be designed by a registered design professional to provide vertical and lateral support.

Section ID: text-id-27438772-0

The retention system design shall include requirements for monitoring of the system and adjacent structures for horizontal and vertical movement.

Section ID: text-id-27438774-0

Elements of the system shall only be removed or decommissioned where adequate replacement support is provided by backfill or by the new structure. Removal or decommissioning shall be performed in such a manner that protects the adjacent property.

Section ID: text-id-27438776-0

The temporary use of streets or public property for the storage or handling of materials or equipment required for construction or demolition, and the protection provided to the public shall comply with the provisions of the applicable governing authority and this chapter.

Section ID: text-id-27438781-0

Construction materials and equipment shall not be placed or stored so as to obstruct access to fire hydrants, standpipes, fire or police alarm boxes, catch basins or manholes, nor shall such material or equipment be located within 20 feet (6096 mm) of a street intersection, or placed so as to obstruct normal observations of traffic signals or to hinder the use of public transit loading platforms.

Section ID: text-id-27438783-0

Building materials, fences, sheds or any obstruction of any kind shall not be placed so as to obstruct free approach to any fire hydrant, fire department connection, utility pole, manhole, fire alarm box or catch basin, or so as to interfere with the passage of water in the gutter. Protection against damage shall be provided to such utility fixtures during the progress of the work, but sight of them shall not be obstructed.

Section ID: text-id-27438785-0

Structures under construction, alteration or demolition shall be provided with not fewer than one approved portable fire extinguisher in accordance with Section 906 of the International Fire Code and sized for not less than ordinary hazard as follows:

Section ID: text-id-27438789-0

1.At each stairway on all floor levels where combustible materials have accumulated.

Section ID: text-id-27438789-1

2.In every storage and construction shed.

Section ID: text-id-27438789-2

3.Additional portable fire extinguishers shall be provided where special hazards exist, such as the storage and use of flammable and combustible liquids.

Section ID: text-id-27438789-3

The provisions of this code and of the International Fire Code shall be strictly observed to safeguard against all fire hazards attendant upon construction operations.

Section ID: text-id-27438791-0

Where building construction exceeds 40 feet (12 192 mm) in height above the lowest level of fire department vehicle access, a temporary or permanent stairway shall be provided. As construction progresses, such stairway shall be extended to within one floor of the highest point of construction having secured decking or flooring.

Section ID: text-id-27438795-0

Means of egress and required accessible means of egress shall be maintained at all times during construction, demolition, remodeling or alterations and additions to any building.

Section ID: text-id-27438797-0

Exception: Existing means of egress need not be maintained where approved temporary means of egress and accessible means of egress systems and facilities are provided.

Section ID: text-id-27438797-1

In buildings required to have standpipes by Section 905.3.1 of the International Building Code, not less than one standpipe shall be provided for use during construction. Such standpipes shall be installed prior to construction exceeding 40 feet (12 192 mm) in height above the lowest level of fire department vehicle access. Such standpipes shall be provided with fire department hose connections at locations adjacent to stairways, complying with Section 1505.1. As construction progresses, such standpipes shall be extended to within one floor of the highest point of construction having secured decking or flooring.

Section ID: text-id-27438801-0

Where a building or portion of a building is being demolished and a standpipe is existing within such a building, such standpipe shall be maintained in an operable condition so as to be available for use by the fire department. Such standpipe shall be demolished with the building but shall not be demolished more than one floor below the floor being demolished.

Section ID: text-id-27438803-0

Standpipes shall be installed in accordance with the provisions of Chapter 9 of the International Building Code.

Section ID: text-id-27438805-0

Exception: Standpipes shall be either temporary or permanent in nature, and with or without a water supply, provided that such standpipes conform to the requirements of Section 905 of the International Building Code as to capacity, outlets and materials.

Section ID: text-id-27438805-1

In buildings where an automatic sprinkler system is required by this code or the International Building Code, it shall be unlawful to occupy any portions of a building or structure until the automatic sprinkler system installation has been tested and approved, except as provided in Section 110.3.

Section ID: text-id-27438809-0

Operation of sprinkler control valves shall be permitted only by properly authorized personnel and shall be accompanied by notification of duly designated parties. When the sprinkler protection is being regularly turned off and on to facilitate connection of newly completed segments, the sprinkler control valves shall be checked at the end of each work period to ascertain that protection is in service.

Section ID: text-id-27438811-0

Structures, sites and equipment directly associated with the actual process of construction, including, but not limited to, scaffolding, bridging, material hoists, material storage or construction trailers, are not required to be accessible.

Section ID: text-id-27438815-0

An approved water supply for fire protection, either temporary or permanent, shall be made available as soon as combustible building material arrives on the site, on commencement of vertical combustible construction, and on installation of a standpipe system in buildings under construction, in accordance with Sections 1509.1 through 1509.5.

Section ID: text-id-27438819-0

Exception: The fire code official is authorized to reduce the fire-flow requirements for isolated buildings or a group of buildings in rural areas or small communities where the development of full fire-flow requirements is impractical.

Section ID: text-id-27438819-1

When combustible building materials of the building under construction are delivered to a site, a minimum fire flow of 500 gallons per minute (1893 L/m) shall be provided. The fire hydrant used to provide this fire flow supply shall be within 500 feet (152 m) of the combustible building materials as measured along an approved fire apparatus access lane. Where the site configuration is such that one fire hydrant cannot be located within 500 feet (152 m) of all combustible building materials, additional fire hydrants shall be required to provide coverage in accordance with this section.

Section ID: text-id-27438821-0

Prior to commencement of vertical construction of Type III, IV or V buildings that utilize any combustible building materials, the fire flow required by Sections 1509.3.1 through 1509.3.3 shall be provided, accompanied by fire hydrants in sufficient quantity to deliver the required fire flow and proper coverage.

Section ID: text-id-27438823-0

Where a building of Type III, IV or V construction has a fire separation distance of less than 30 feet (9144 mm) from property lot lines, and an adjacent property has an existing structure or otherwise can be built on, the water supply shall provide either a minimum of 500 gallons per minute (1893 L/m), or the entire fire flow required for the building when constructed, whichever is greater.

Section ID: text-id-27438824-0

Where a building of Type III, IV or V construction has a fire separation distance of 30 feet (9144 mm) up to 60 feet (18 288 mm) from property lot lines, and an adjacent property has an existing structure or otherwise can be constructed upon, the water supply shall provide a minimum of 500 gallons per minute (1893 L/m), or 50 percent of the fire flow required for the building when constructed, whichever is greater.

Section ID: text-id-27438826-0

Where a building of Type III, IV or V construction has a fire separation of 60 feet (18 288 mm) or greater from a property lot line, a water supply of 500 gallons per minute (1893 L/m) shall be provided.

Section ID: text-id-27438828-0

If combustible construction materials are delivered to the construction site, water supply in accordance with Section 1509.2 shall be provided. Additional water supply for fire flow is not required prior to commencing vertical construction of Type I and II buildings.

Section ID: text-id-27438831-0

Regardless of the presence of combustible building materials, the construction type or the fire separation distance, where a standpipe is required in accordance with Section 1506, a water supply providing a minimum flow of 500 gallons per minute (1893 L/m) shall be provided. The fire hydrant used for this water supply shall be located within 100 feet (30 480 mm) of the fire department connection supplying the standpipe.

Section ID: text-id-27438833-0

CHAPTER 16 REFERENCED STANDARDS

Section ID: text-id-27438837 | Section Number: 27438837

User Note: User note:About this chapter: This code contains numerous references to standards that are u

User note:

Section ID: text-id-27438837-0

About this chapter: This code contains numerous references to standards that are used to regulate materials and methods of construction. Chapter 16 contains a comprehensive list of all standards that are referenced in the code, including the appendices. The standards are part of the code to the extent of the reference to the standard. Compliance with the referenced standard is necessary for compliance with this code. By providing specifically adopted standards, the construction and installation requirements necessary for compliance with the code can be readily determined. The basis for code compliance is, therefore, established and available on an equal basis to the building code official, contractor, designer and owner.

Section ID: text-id-27438837-1

This chapter lists the standards that are referenced in various sections of this document. The standards are listed herein by the promulgating agency of the standard, the standard identification, the effective date and title, and the section or sections of this document that reference the standard. The application of the referenced standards shall be as specified in Section 102.4.

Section ID: text-id-27438837-2

ASCE/SEI

Section ID: text-id-27438838-0

7—1988:

Section ID: text-id-27438838-1

Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Section ID: text-id-27438838-2

503.12 , 706.3.2

Section ID: text-id-27438838-3

7—1993:

Section ID: text-id-27438838-4

Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Section ID: text-id-27438838-5

503.12 , 706.3.2

Section ID: text-id-27438838-6

7—1995:

Section ID: text-id-27438838-7

Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Section ID: text-id-27438838-8

503.12 , 706.3.2

Section ID: text-id-27438838-9

7—1998:

Section ID: text-id-27438838-10

Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Section ID: text-id-27438838-11

503.12 , 706.3.2

Section ID: text-id-27438838-12

7—2002:

Section ID: text-id-27438838-13

Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Section ID: text-id-27438838-14

503.12 , 706.3.2

Section ID: text-id-27438838-15

7—2005:

Section ID: text-id-27438838-16

Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Section ID: text-id-27438838-17

503.12 , 706.3.2

Section ID: text-id-27438838-18

7—2010:

Section ID: text-id-27438838-19

Minimum Design Loads for Buildings and Other Structures

Section ID: text-id-27438838-20

503.12 , 706.3.2

Section ID: text-id-27438838-21

7—2016:

Section ID: text-id-27438838-22

Minimum Design Loads and Associated Criteria for Buildings and Other Structures with Supplement 1

Section ID: text-id-27438838-23

304.2, 304.3.1, 503.4, 503.12, 503.13, 706.3.2, 805.3, 805.4

Section ID: text-id-27438838-24

41—2017:

Section ID: text-id-27438838-25

Seismic Evaluation and Retrofit of Existing Buildings

Section ID: text-id-27438838-26

304.3.1, Table 304.3.1, 304.3.2, Table 304.3.2

Section ID: text-id-27438838-27

ASHRAE

Section ID: text-id-27438840-0

62.1—2019

Section ID: text-id-27438840-1

Ventilation for Acceptable Indoor Air Quality

Section ID: text-id-27438840-2

807.2

Section ID: text-id-27438840-3

ASME

Section ID: text-id-27438842-0

A17.1—2019/CSA B44—19:

Section ID: text-id-27438842-1

Safety Code for Elevators and Escalators

Section ID: text-id-27438842-2

306.7.7, 902.1.2

Section ID: text-id-27438842-3

A17.3—2017:

Section ID: text-id-27438842-4

Safety Code for Existing Elevators and Escalators

Section ID: text-id-27438842-5

902.1.2

Section ID: text-id-27438842-6

A18.1—2020:

Section ID: text-id-27438842-7

Safety Standard for Platform Lifts and Stairway Chair Lifts

Section ID: text-id-27438842-8

306.7.8

Section ID: text-id-27438842-9

ASTM

Section ID: text-id-27438844-0

C94/C94M—17A:

Section ID: text-id-27438844-1

Specification for Ready-mixed Concrete

Section ID: text-id-27438844-2

109.3.1

Section ID: text-id-27438844-3

E108—17:

Section ID: text-id-27438844-4

Standard Test Methods for Fire Tests of Roof Coverings

Section ID: text-id-27438844-5

1204.5

Section ID: text-id-27438844-6

E136—2019:

Section ID: text-id-27438844-7

Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 Degrees C

Section ID: text-id-27438844-8

F2006—17:

Section ID: text-id-27438844-10

Standard Safety Specification for Window Fall Prevention Devices for Non-Emergency Escape (Egress) and Rescue (Ingress) Windows

Section ID: text-id-27438844-11

505.2, 702.4

Section ID: text-id-27438844-12

F2090—17:

Section ID: text-id-27438844-13

Standard Specification for Window Fall Prevention Devices with Emergency (Egress) Release Mechanisms

Section ID: text-id-27438844-14

505.2, 505.3.1, 702.4, 702.5.1

Section ID: text-id-27438844-15

IBC—21:

Section ID: text-id-27438846-1

International Building Code®

Section ID: text-id-27438846-2

101.4.1, 104.2.1, 106.2.2, 109.3.3, 109.3.6, 109.3.9, 109.3.10, 110.2, 202, 301.3, 302.4.1, 302.5, 303.1, 303.2.2, 304.1, 304.3.1, 304.3.2, 305.1, 306.5, 306.7, 306.7.2, 306.7.4, 306.7.5, 306.7.9, 306.7.10, 306.7.10.1, 306.7.10.2, 306.7.10.3, 306.7.11, 306.7.12, 306.7.13, 306.7.15, 306.7.16, 306.7.16.3, 306.7.16.4, 306.7.16.5, 306.7.16.7, 309.2, 401.3, 402.1, 405.2.1.1, 405.2.3.1, 405.2.3.3, 405.2.4, 405.2.5, 405.2.6, 501.2, 502.1, 502.3, 502.4, 502.5, 503.1, 503.2, 503.3, 503.4, 503.5, 503.11, 503.12, 503.13, 503.14, 503.15, 503.17, 503.18, 505.3, 505.4, 506.1, 506.3, 506.4, 506.5.1, 506.5.2, 506.5.3, 506.5.4, 507.3, 701.2, 701.3, 702.1, 702.2, 702.3, 702.5, 702.6, 702.7, 704.1.1, 704.3, 705.1, 705.2, 706.2, 706.3.2, 802.2.1, 802.2.3, 802.3, 802.4, 802.5.2, 802.6, 802.6, 803.1.1, 803.2, 803.2.2, 803.2.3, 803.2.4, 803.2.5, 803.3, 804.1, 804.4.1, 804.4.1.1, Table 804.4.1.1(1), 804.4.1.2.1, 804.5.1.2, 804.5.3, 804.5.4, 804.5.5, 804.6, 804.7, 804.8.1, 804.9.1, 804.10.2, 804.11, 804.12.2, 805.2, 805.3, 805.4, 904.1.2, 904.1.3, 904.1.4, 904.1.6, 904.1.7, 904.2, 904.2.1, 904.2.2, 905.2, 905.3, 905.4, 906.2, 906.3, 906.6, 1001.2, 1001.3, 1002.1, 1002.2, 1002.3, 1002.4, 1004.1, 1006.1, 1006.2, 1006.3, 1006.4, 1010.1, 1011.1, 1011.2.1, 1011.2.2, 1011.3, 1011.5.1, 1011.5.2, 1011.5.3, 1011.5.6, 1011.6.1, 1011.6.1.1, 1011.6.3, 1011.7.1, 1011.7.2, 1011.7.3, 1011.8.1, 1011.8.2, 1011.8.3, 1102.1, 1102.2, 1102.3, 1103.1, 1103.2, 1103.3, 1201.4, 1202.2, 1203.12, 1204.2, 1204.9, 1206.1, 1301.2.2, 1301.2.3, 1301.2.4, 1301.3.3, 1301.4.1, 1301.6.1, 1301.6.1.1, 1301.6.2, 1301.6.2.1, 1301.6.3.2, 1301.6.3.3, 1301.6.4.1, 1301.6.5, 1301.6.5.1, 1301.6.6, 1301.6.7.1, 1301.6.8, 1301.6.9, 1301.6.9.1, 1301.6.10, 1301.6.10.1, 1301.6.11, 1301.6.11.1, 1301.6.12.1, 1301.6.13, Table 1301.6.15, 1301.6.15.1, 1301.6.16.1, 1301.6.17, 1301.6.17.1, 1301.6.18, 1301.6.18.1, 1301.6.19, Table 1301.6.19, 1301.6.20, 1301.6.20.1, 1301.9.1, 1401.2, 1402.1, 1402.2, 1402.2.1, 1402.3, 1402.4, 1402.5, 1402.6, 1501.5, 1501.6.1, 1501.6.4.1, 1501.6.7, 1506.1, 1506.3, 1507.1

Section ID: text-id-27438846-3

ICC 300—17:

Section ID: text-id-27438846-4

ICC Standard on Bleachers, Folding and Telescopic Seating and Grandstands

Section ID: text-id-27438846-5

301.1.1

Section ID: text-id-27438846-6

ICC 500—20

Section ID: text-id-27438846-7

Standard for the Design and Construction of Storm Shelters

Section ID: text-id-27438846-8

303.1, 303.2

Section ID: text-id-27438846-9

ICC A117.1—17

Section ID: text-id-27438846-10

Accessible and Usable Buildings and Facilities

Section ID: text-id-27438846-11

306.3, 306.7, 306.7.11, 306.7.12

Section ID: text-id-27438846-12

IECC—21:

Section ID: text-id-27438846-13

International Energy Conservation Code®

Section ID: text-id-27438846-14

302.2, 702.7, 708.1, 809.1, 907.1, 1104.1

Section ID: text-id-27438846-15

IFC—21:

Section ID: text-id-27438846-16

International Fire Code®

Section ID: text-id-27438846-17

101.2.1, 101.4.2, 301.3.1, 302.2, 307.1, 308.1, 802.2.1, 802.2.3, 803.2.3, 803.4.1.1, 803.4.1.2, 803.4.1.3, 803.4.1.4, 803.4.1.5, 803.4.1.6, 904.1.5, 1011.6.1.1, 1301.3.2, 1301.6.8.1, 1301.6.14, 1301.6.14.1, 1401.2, 1501.5, 1504.1, 1504.2

Section ID: text-id-27438846-18

IFGC—21:

Section ID: text-id-27438846-19

International Fuel Gas Code®

Section ID: text-id-27438846-20

302.2, 702.7.1

Section ID: text-id-27438846-21

IMC—21:

Section ID: text-id-27438846-22

International Mechanical Code®

Section ID: text-id-27438846-23

302.2, 702.7, 807.1, 902.1.1, 1008.1, 1301.6.7.1, 1301.6.8, 1301.6.8.1

Section ID: text-id-27438846-24

IPC—21:

Section ID: text-id-27438846-25

International Plumbing Code®

Section ID: text-id-27438846-26

302.2, 408.1, 702.7, 1009.1, 1009.2, 1009.3, 1009.5, 1501.7

Section ID: text-id-27438846-27

IPMC—21:

Section ID: text-id-27438846-28

International Property Maintenance Code®

Section ID: text-id-27438846-29

101.4.2, 302.2, 1301.3.2, 1401.2

Section ID: text-id-27438846-30

IRC—21:

Section ID: text-id-27438846-31

International Residential Code®

Section ID: text-id-27438846-32

101.2, 101.4.1, 104.2.1, 109.3.3, 109.3.10, 302.2, 307.1, 308.1, 401.3, 402.1, 405.2.6, 502.3, 502.4, 502.5, 503.2, 503.3, 503.11, 505.2, 505.3, 507.3, 701.3, 702.4, 702.5, 706.2, 708.1, 805.2, 806.4, 809.1, 906.2, 907.1, 1011.2.1, 1103.1, 1103.2, 1103.3, 1104.1, 1201.4, 1301.2.2, 1301.2.3, 1301.3.3, 1401.2, 1402.1, 1402.2, 1402.2.1, 1402.3, 1402.4, 1402.5, 1402.6

Section ID: text-id-27438846-33

NFPA

Section ID: text-id-27438848-0

13R—19:

Section ID: text-id-27438848-1

Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height

Section ID: text-id-27438848-2

803.2.4

Section ID: text-id-27438848-3

70—20:

Section ID: text-id-27438848-4

National Electrical Code

Section ID: text-id-27438848-5

107.3, 302.2, 406.1.1, 406.1.2, 406.1.3, 406.1.5, 806.1, 806.4.4, 1007.1, 1007.2, 1007.3, 1007.4

Section ID: text-id-27438848-6

72—19:

Section ID: text-id-27438848-7

National Fire Alarm and Signaling Code

Section ID: text-id-27438848-8

803.2.6, 803.4

Section ID: text-id-27438848-9

99—21:

Section ID: text-id-27438848-10

Health Care Facilities Code

Section ID: text-id-27438848-11

302.2.1, 406.1.4, 408.3, 501.3, 707.1, 806.3, 808.1, 1007.1

Section ID: text-id-27438848-12

101—21:

Section ID: text-id-27438848-13

Life Safety Code

Section ID: text-id-27438848-14

804.2

Section ID: text-id-27438848-15

790—04:

Section ID: text-id-27438850-1

Standard Test Methods for Fire Tests of Roof Coverings—with Revisions through October 2018

Section ID: text-id-27438850-2

1204.5

Section ID: text-id-27438850-3

CHAPTER 2 DEFINITIONS

Section ID: text-id-27436567 | Section Number: 27436567

User Note: User note:About this chapter: Codes, by their very nature, are technical documents. Every wo

User note:

Section ID: text-id-27436567-0

About this chapter: Codes, by their very nature, are technical documents. Every word, term and punctuation mark can add to or change the meaning of a technical requirement. It is necessary to maintain a consensus on the specific meaning of each term contained in the code. Chapter 2 performs this function by stating clearly what specific terms mean for the purpose of the code.

Section ID: text-id-27436567-1

Unless otherwise expressly stated, the following words and terms shall, for the purposes of this code, have the meanings shown in this chapter.

Section ID: text-id-27436569-0

Words used in the present tense include the future; words stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.

Section ID: text-id-27436571-0

Where terms are not defined in this code and are defined in the other International Codes, such terms shall have the meanings ascribed to them in those codes.

Section ID: text-id-27436573-0

Where terms are not defined through the methods authorized by this chapter, such terms shall have ordinarily accepted meanings such as the context implies.

Section ID: text-id-27436575-0

[A] ADDITION. An extension or increase in floor area, number of stories, or height of a building or structure.

Section ID: text-id-27436578-0

[A] ALTERATION. Any construction or renovation to an existing structure other than a repair or addition.

Section ID: text-id-27436578-1

[A] APPROVED. Acceptable to the code official.

Section ID: text-id-27436578-2

[A] BUILDING. Any structure utilized or intended for supporting or sheltering any occupancy.

Section ID: text-id-27436578-3

[A] CHANGE OF OCCUPANCY. Any of the following shall be considered as a change of occupancy where the current International Building Code requires a greater degree of safety,

accessibility, structural strength, fire protection, means of egress, ventilation or sanitation than is existing in the current building or structure:

Section ID: text-id-27436578-4

1. Any change in the occupancy classification of a building or structure.

Section ID: text-id-27436578-5

2. Any change in the purpose of, or a change in the level of activity within, a building or structure.

Section ID: text-id-27436578-6

3. A change of use.

Section ID: text-id-27436578-7

[A] CHANGE OF USE. A change in the use of a building or a portion of a building, within the same group classification, for which there is a change in application of the code requirements.

Section ID: text-id-27436578-8

[A] CODE OFFICIAL. The officer or other designated authority charged with the administration and enforcement of this code.

Section ID: text-id-27436578-9

[BS] DANGEROUS. Any building, structure or portion thereof that meets any of the conditions described below shall be deemed dangerous:

Section ID: text-id-27436578-10

1. The building or structure has collapsed, has partially collapsed, has moved off its foundation or lacks the necessary support of the ground.

Section ID: text-id-27436578-11

2. There exists a significant risk of collapse, detachment or dislodgement of any portion, member, appurtenance or ornamentation of the building or structure under permanent, routine or frequent loads; under actual loads already in effect; or under snow, wind, rain, flood, earthquake or other environmental loads when such loads are imminent.

Section ID: text-id-27436578-12

[A] DEFERRED SUBMITTAL. Those portions of the design that are not submitted at the time of the application and that are to be submitted to the code official within a specified period.

Section ID: text-id-27436578-13

[BS] DISPROPORTIONATE EARTHQUAKE DAMAGE. A condition of earthquake-related damage where both of the following occur:

Section ID: text-id-27436578-14

1. The 0.3-second spectral acceleration at the building site as estimated by the United States Geological Survey for the earthquake in question is less than 40 percent of the mapped acceleration parameter SS.

Section ID: text-id-27436578-15

2. The vertical elements of the lateral force-resisting system have suffered damage such that the lateral load-carrying capacity of any story in any horizontal direction has been reduced by more

than 10 percent from its predamage condition.

Section ID: text-id-27436578-16

[BE] EMERGENCY ESCAPE AND RESCUE OPENING. An operable exterior window, door or other similar device that provides for a means of escape and access for rescue in the event of an emergency.

Section ID: text-id-27436578-17

EQUIPMENT OR FIXTURE. Any plumbing, heating, electrical, ventilating, air conditioning, refrigerating and fire protection equipment; and elevators, dumbwaiters, escalators, boilers, pressure vessels and other mechanical facilities; or installations that are related to building services. Equipment or fixture shall not include manufacturing, production or process equipment, but shall include connections from building service to process equipment.

Section ID: text-id-27436578-18

[A] EXISTING BUILDING. A building erected prior to the date of adoption of the appropriate code, or one for which a legal building permit has been issued.

Section ID: text-id-27436578-19

[A] EXISTING STRUCTURE. A structure erected prior to the date of adoption of the appropriate code, or one for which a legal building permit has been issued.

Section ID: text-id-27436578-20

[BF] EXTERIOR WALL COVERING. A material or assembly of materials applied on the exterior side of exterior walls for the purpose of providing a weather-resisting barrier, insulation or for aesthetics, including but not limited to, veneers, siding, exterior insulation and finish systems, architectural trim and embellishments, such as cornices, soffits, facias, gutters and leaders.

Section ID: text-id-27436578-21

[BF] EXTERIOR WALL ENVELOPE. A system or assembly of exterior wall components, including exterior wall finish materials, that provides protection of the building structural members, including framing and sheathing materials, and conditioned interior space from the detrimental effects of the exterior environment.

Section ID: text-id-27436578-22

[A] FACILITY. All or any portion of buildings, structures, site improvements, elements and pedestrian or vehicular routes located on a site.

Section ID: text-id-27436578-23

[BS] FLOOD HAZARD AREA. The greater of the following two areas:

Section ID: text-id-27436578-24

1. The area within a flood plain subject to a 1-percent or greater chance of flooding in any year.

Section ID: text-id-27436578-25

2. The area designated as a flood hazard area on a community’s flood hazard map, or otherwise legally designated.

Section ID: text-id-27436578-26

[A] HISTORIC BUILDING. Any building or structure that is one or more of the following:

Section ID: text-id-27436578-27

1. Listed, or certified as eligible for listing, by the State Historic Preservation Officer or the Keeper of the National Register of Historic Places, in the National Register of Historic Places.

Section ID: text-id-27436578-28

2. Designated as historic under an applicable state or local law.

Section ID: text-id-27436578-29

3. Certified as a contributing resource within a National Register, state designated or locally designated historic district.

Section ID: text-id-27436578-30

[BF] NONCOMBUSTIBLE MATERIAL. A material that, under the conditions anticipated, will not ignite or burn when subjected to fire or heat. Materials that pass ASTM E136 are considered noncombustible materials.

Section ID: text-id-27436578-32

PRIMARY FUNCTION. A primary function is a major activity for which the facility is intended. Areas that contain a primary function include, but are not limited to, the customer services lobby of a bank, the dining area of a cafeteria, the meeting rooms in a conference center, as well as offices and other work areas in which the activities of the public accommodation or other private entity using the facility are carried out. Mechanical rooms, boiler rooms, supply storage rooms, employee lounges or locker rooms, janitorial closets, entrances, corridors and restrooms are not areas containing a primary function.

Section ID: text-id-27436578-33

[A] REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. A registered design professional engaged by the owner or the owner’s authorized agent to review and coordinate certain aspects of the project, as determined by the code official, for compatibility with the design of the building or structure, including submittal documents prepared by others, deferred submittal documents and phased submittal documents.

Section ID: text-id-27436578-34

REHABILITATION. Any work, as described by the categories of work defined herein, undertaken in an existing building.

Section ID: text-id-27436578-35

[A] RELOCATABLE BUILDING. A partially or completely assembled building constructed and designed to be reused multiple times and transported to different building sites.

Section ID: text-id-27436578-36

[A] REPAIR. The reconstruction, replacement or renewal of any part of an existing building for the purpose of its maintenance or to correct damage.

Section ID: text-id-27436578-37

[BS] REROOFING. The process of recovering or replacing an existing roof covering. See “Roof recover” and “Roof replacement.”

Section ID: text-id-27436578-38

[BS] RISK CATEGORY. A categorization of buildings and other structures for determination of flood, wind, snow, ice and earthquake loads based on the risk associated with unacceptable performance, as provided in Section 1604.5 of the International Building Code.

Section ID: text-id-27436578-39

[BS] ROOF COATING. A fluid-applied adhered coating used for roof maintenance, roof repair or as a component of a roof covering system or roof assembly.

Section ID: text-id-27436578-40

[BS] ROOF RECOVER. The process of installing an additional roof covering over a prepared existing roof covering without removing the existing roof covering.

Section ID: text-id-27436578-41

[BS] ROOF REPAIR. Reconstruction or renewal of any part of an existing roof for the purpose of correcting damage or restoring the predamage condition.

Section ID: text-id-27436578-42

[BS] ROOF REPLACEMENT. The process of removing the existing roof covering, repairing any damaged substrate and installing a new roof covering.

Section ID: text-id-27436578-43

[BS] SEISMIC FORCES. The loads, forces and requirements prescribed herein, related to the response of the building to earthquake motions, to be used in the analysis and design of the structure and its components. Seismic forces are considered either full or reduced, as provided in Chapter 3.

Section ID: text-id-27436578-44

[BS] SUBSTANTIAL DAMAGE. For the purpose of determining compliance with the flood provisions of this code, damage of any origin sustained by a structure whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

Section ID: text-id-27436578-45

[BS] SUBSTANTIAL IMPROVEMENT. For the purpose of determining compliance with the flood provisions of this code, any repair, alteration, addition or improvement of a building or structure, the cost of which equals or exceeds 50 percent of the market value of the structure, before the improvement or repair is started. If the structure has sustained substantial damage, any repairs are considered substantial improvement regardless of the actual repair work performed. The term does not, however, include either of the following:

Section ID: text-id-27436578-46

1. Any project for improvement of a building required to correct existing health, sanitary or safety code violations identified by the code official and that is the minimum necessary to ensure safe living conditions.

Section ID: text-id-27436578-47

2. Any alteration of a historic structure, provided that the alteration will not preclude the structure’s continued designation as a historic structure.

Section ID: text-id-27436578-48

[BS] SUBSTANTIAL STRUCTURAL ALTERATION. An alteration in which the gravity load-carrying structural elements altered within a 5-year period support more than 30 percent of the total floor and roof area of the building or structure. The areas to be counted toward the 30 percent shall include mezzanines, penthouses, and in-filled courts and shafts tributary to the altered structural elements.

Section ID: text-id-27436578-49

[BS] SUBSTANTIAL STRUCTURAL DAMAGE. A condition where any of the following apply:

Section ID: text-id-27436578-50

1. The vertical elements of the lateral force-resisting system have suffered damage such that the lateral load-carrying capacity of any story in any horizontal direction has been reduced by more than 33 percent from its predamage condition.

Section ID: text-id-27436578-51

2. The capacity of any vertical component carrying gravity load, or any group of such components, that has a tributary area more than 30 percent of the total area of the structure’s floor(s) and roof(s) has been reduced more than 20 percent from its predamage condition, and the remaining capacity of such affected elements, with respect to all dead and live loads, is less than 75 percent of that required by the International Building Code for new buildings of similar structure, purpose and location.

Section ID: text-id-27436578-52

3. The capacity of any structural component carrying snow load, or any group of such components, that supports more than 30 percent of the roof area of similar construction has been reduced more than 20 percent from its predamage condition, and the remaining capacity with respect to dead, live and snow loads is less than 75 percent of that required by the International Building Code for new buildings of similar structure, purpose and location.

Section ID: text-id-27436578-53

TECHNICALLY INFEASIBLE. An alteration of a facility that has little likelihood of being accomplished because the existing structural conditions require the removal or alteration of a load-bearing member that is an essential part of the structural frame, or because other existing physical or site constraints prohibit modification or addition of elements, spaces or features which are in full and strict compliance with the minimum requirements for new construction and which are necessary to provide accessibility.

Section ID: text-id-27436578-54

UNSAFE. Buildings, structures or equipment that are unsanitary, or that are deficient due to inadequate means of egress facilities, inadequate light and ventilation, or that constitute a fire hazard, or in which the structure or individual structural members meet the definition of “Dangerous,” or that are otherwise dangerous to human life or the public welfare, or that involve illegal or improper occupancy or inadequate maintenance shall be deemed unsafe. A vacant structure that is not secured against entry shall be deemed unsafe.

Section ID: text-id-27436578-55

WORK AREA. That portion or portions of a building consisting of all reconfigured spaces as indicated on the construction documents. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed and portions of the building

where work not initially intended by the owner is specifically required by this code.

Section ID: text-id-27436578-56

CHAPTER 3 PROVISIONS FOR ALL COMPLIANCE METHODS

Section ID: text-id-27436581 | Section Number: 27436581

User Note: User note:About this chapter: Chapter 3 explains the three compliance options for alterations a

User note:

Section ID: text-id-27436581-0

About this chapter: Chapter 3 explains the three compliance options for alterations and additions available in the code. In addition, this chapter also lays out the methods to be used for seismic design and evaluation throughout this code. Finally, this chapter clarifies that provisions in other I-Codes® related to repairs, alterations, additions, relocation and changes of occupancy must also be addressed unless they conflict with this code. In that case, this code takes precedence.

Section ID: text-id-27436581-1

The repair, alteration, change of occupancy, addition or relocation of all existing buildings shall comply with Section 301.2, 301.3 or 301.4.The provisions of Sections 302 through 309 shall apply to all alterations, repairs, additions, relocation of structures and changes of occupancy regardless of compliance method.

Section ID: text-id-27436583-0

Existing bleachers, grandstands and folding and telescopic seating shall comply with ICC 300.

Section ID: text-id-27436584-0

Repairs shall comply with the requirements of Chapter 4.

Section ID: text-id-27436587-0

The alteration, addition or change of occupancy of all existing buildings shall comply with one of the methods listed in Section 301.3.1, 301.3.2 or 301.3.3 as selected by the applicant. Sections 301.3.1 through 301.3.3 shall not be applied in combination with each other.

Section ID: text-id-27436589-0

Exception: Subject to the approval of the code official, alterations complying with the laws in existence at the time the building or the affected portion of the building was built shall be considered in compliance with the provisions of this code. New structural members added as part of the alteration shall comply with the International Building Code. This exception shall not apply to the following:

Section ID: text-id-27436589-1

1.Alterations for accessibility required by Section 306.

Section ID: text-id-27436589-2

2.Alterations that constitute substantial improvement in flood hazard areas, which shall comply with Sections 503.2, 701.3 or 1301.3.3.

Section ID: text-id-27436589-3

3.Structural provisions of Sections 304, Chapter 5 or to the structural provisions of Sections 706, 805 and 906.

Section ID: text-id-27436589-4

Alterations, additions and changes of occupancy complying with Chapter 5 of this code in buildings complying with the International Fire Code shall be considered in compliance with the provisions of this code.

Section ID: text-id-27436590-0

Alterations, additions and changes of occupancy complying with the applicable requirements of Chapters 6 through 12 of this code shall be considered in compliance with the provisions of this code.

Section ID: text-id-27436592-0

Alterations, additions and changes of occupancy complying with Chapter 13 of this code shall be considered in compliance with the provisions of this code.

Section ID: text-id-27436594-0

Relocated buildings shall comply with the requirements of Chapter 14.

Section ID: text-id-27436597-0

The code official shall have the authority to require the elimination of conditions deemed dangerous.

Section ID: text-id-27436601-0

Alterations, repairs, additions and changes of occupancy to, or relocation of, existing buildings and structures shall comply with the provisions for alterations, repairs, additions and changes of occupancy or relocation, respectively, in this code and the International Energy Conservation Code, International Fire Code, International Fuel Gas Code, International Mechanical Code, International Plumbing Code, International Private Sewage Disposal Code, International Property Maintenance Code, International Residential Code and NFPA 70. Where provisions of the other codes conflict with provisions of this code, the provisions of this code shall take precedence.

Section ID: text-id-27436603-0

In existing Group I-2 occupancies, ambulatory health care facilities, outpatient clinics and hyperbaric facilities, alterations, repairs, additions and changes of occupancy to, or relocation of, existing buildings and structures shall also comply with NFPA 99.

Section ID: text-id-27436604-0

Materials already in use in a building in compliance with requirements or approvals in effect at the time of their erection or installation shall be permitted to remain in use unless determined by the code official to be unsafe.

Section ID: text-id-27436607-0

Except as otherwise required or permitted by this code, materials permitted by the applicable code for new construction shall be used. Like materials shall be permitted for repairs and alterations, provided that unsafe conditions are not created. Hazardous materials shall not be used where the code for new construction would not permit their use in buildings of similar

occupancy, purpose and location.

Section ID: text-id-27436609-0

New structural members and connections shall comply with the detailing provisions of the International Building Code for new buildings of similar structure, purpose and location.

Section ID: text-id-27436610-0

Exception: Where alternative design criteria are specifically permitted.

Section ID: text-id-27436610-1

Where determining the appropriate application of the referenced sections of this code, the occupancy and use of a building shall be determined in accordance with Chapter 3 of the International Building Code.

Section ID: text-id-27436613-0

This section applies to the construction of storm shelters constructed as rooms or spaces within existing buildings for the purpose of providing protection during storms that produce high winds, such as tornados and hurricanes. Such structures shall be designated to be hurricane shelters, tornado shelters, or combined hurricane and tornado shelters. Such structures shall be constructed in accordance with this code and ICC 500.

Section ID: text-id-27436617-0

Where an addition is added to an existing Group E occupancy located in an area where the shelter design wind speed for tornados is 250 mph (402.3 km/h) in accordance with Figure 304.2(1) of ICC 500 and the occupant load in the addition is 50 or more, the addition shall have a storm shelter constructed in accordance with ICC 500.

Section ID: text-id-27436619-0

Exceptions:

Section ID: text-id-27436619-1

1.Group E day care facilities.

Section ID: text-id-27436619-2

2.Group E occupancies accessory to places of religious worship.

Section ID: text-id-27436619-3

3.Additions meeting the requirements for shelter design in ICC 500.

Section ID: text-id-27436619-4

The required occupant capacity of the storm shelter shall include all buildings on the site, and shall be the total occupant load of the classrooms, vocational rooms and offices in the Group E occupancy.

Section ID: text-id-27436620-0

Exceptions:

Section ID: text-id-27436620-1

1.Where an addition is being added on an existing Group E site, and where the addition is not of sufficient size to accommodate the required occupant capacity of the storm shelter for all of the

buildings on-site, the storm shelter shall at a minimum accommodate the required capacity for the addition.

Section ID: text-id-27436620-2

2.Where approved by the code official, the required occupant capacity of the shelter shall be permitted to be reduced by the occupant capacity of any existing storm shelters on the site.

Section ID: text-id-27436620-3

The occupancy classification for storm shelters shall be determined in accordance with Section 423.3 of the International Building Code.

Section ID: text-id-27436622-0

Where an addition or alteration does not result in increased design live load, existing gravity load-carrying structural elements shall be permitted to be evaluated and designed for live loads approved prior to the addition or alteration. If the approved live load is less than that required by Section 1607 of the International Building Code, the area designated for the nonconforming live load shall be posted with placards of approved design indicating the approved live load. Where the addition or alteration results in increased design live load, the live load required by Section 1607 of the International Building Code shall be used.

Section ID: text-id-27436627-0

Where an alteration or addition changes the potential snow drift effects on an adjacent building, the code official is authorized to enforce Section 7.12 of ASCE 7.

Section ID: text-id-27436629-0

Where required, seismic evaluation or design shall be based on the procedures and criteria in this section, regardless of which compliance method is used.

Section ID: text-id-27436631-0

Where compliance requires the use of full seismic forces, the criteria shall be in accordance with one of the following:

Section ID: text-id-27436632-0

1.One-hundred percent of the values in the International Building Code. Where the existing seismic force-resisting system is a type that can be designated as “Ordinary,” values of R, Ω0 and Cd used for analysis in accordance with Chapter 16 of the International Building Code shall be those specified for structural systems classified as “Ordinary” in accordance with Table 12.2-1 of ASCE 7, unless it can be demonstrated that the structural system will provide performance equivalent to that of a “Detailed,” “Intermediate” or “Special” system.

Section ID: text-id-27436632-1

2.ASCE 41, using a Tier 3 procedure and the two-level performance objective in Table 304.3.1 for the applicable risk category.

Section ID: text-id-27436632-2

[BS] TABLE 304.3.1

Section ID: text-id-27436633-0

PERFORMANCE OBJECTIVES FOR USE IN ASCE 41 FOR COMPLIANCE WITH FULL SEISMIC FORCES

Section ID: text-id-27436633-1

Where seismic evaluation and design is permitted to use reduced seismic forces, the criteria used shall be in accordance with one of the following:

Section ID: text-id-27436652-0

1.The International Building Code using 75 percent of the prescribed forces. Values of R, Ω0 and Cd used for analysis shall be as specified in Section 304.3.1 of this code.

Section ID: text-id-27436652-1

2.Structures or portions of structures that comply with the requirements of the applicable chapter in Appendix A as specified in Items 2.1 through 2.4 and subject to the limitations of the respective Appendix A chapters shall be deemed to comply with this section.

Section ID: text-id-27436652-2

2.1.The seismic evaluation and design of unreinforced masonry bearing wall buildings in Risk Category I or II are permitted to be based on the procedures specified in Appendix Chapter A1.

Section ID: text-id-27436652-3

2.2.Seismic evaluation and design of the wall anchorage system in reinforced concrete and reinforced masonry wall buildings with flexible diaphragms in Risk Category I or II are permitted to be based on the procedures specified in Chapter A2.

Section ID: text-id-27436652-4

2.3.Seismic evaluation and design of cripple walls and sill plate anchorage in residential buildings of light-frame wood construction in Risk Category I or II are permitted to be based on the procedures specified in Chapter A3.

Section ID: text-id-27436652-5

2.4.Seismic evaluation and design of soft, weak or open-front wall conditions in multiple-unit residential buildings of wood construction in Risk Category I or II are permitted to be based on the procedures specified in Chapter A4.

Section ID: text-id-27436652-6

3.ASCE 41, using the performance objective in Table 304.3.2 for the applicable risk category.

Section ID: text-id-27436652-7

[BS] TABLE 304.3.2

Section ID: text-id-27436653-0

PERFORMANCE OBJECTIVES FOR USE IN ASCE 41 FOR COMPLIANCE WITH REDUCED SEISMIC FORCES

Section ID: text-id-27436653-1

a.For Risk Categories I, II and III, the Tier 1 and Tier 2 procedures need not be considered for the BSE-1E earthquake hazard level.

Section ID: text-id-27436670-0

b.For Risk Category III, the Tier 1 screening checklists shall be based on the Collapse Prevention, except that checklist statements using the Quick Check provisions shall be based on MS-factors that are the average of the values for Collapse Prevention and Life Safety.

Section ID: text-id-27436670-1

c.For Risk Category IV, the Tier 1 screening checklists shall be based on Collapse Prevention, except that checklist statements using the Quick Check provisions shall be based on MS-factors for Life Safety.

Section ID: text-id-27436670-2

Where used, in-situ load tests shall be conducted in accordance with Section 1708 of the International Building Code.

Section ID: text-id-27436675-0

The provisions of Sections 306.1 through 306.7.16 apply to maintenance and repair, change of occupancy, additions and alterations to existing buildings, including those identified as historic buildings.

Section ID: text-id-27436679-0

Buildings and facilities shall be designed and constructed to be accessible in accordance with this code and the alteration and existing building provisions in ICC A117.1, as applicable.

Section ID: text-id-27436681-0

A facility that is constructed or altered to be accessible shall be maintained accessible during occupancy. Required accessible means of egress shall be maintained during construction, demolition, remodeling or alterations and additions to any occupied building.

Section ID: text-id-27436683-0

Exception: Existing means of egress need not be maintained where approved temporary means of egress and accessible means of egress systems and facilities are provided.

Section ID: text-id-27436683-1

An alteration that decreases or has the effect of decreasing accessibility of a building, facility or element, thereof, below the requirements for new construction at the time of the alteration is prohibited. The number of accessible elements need not exceed that required for new construction at the time of alteration.

Section ID: text-id-27436684-0

An alteration of an existing facility shall not impose a requirement for greater accessibility than that which would be required for new construction.

Section ID: text-id-27436687-0

Existing buildings that undergo a change of group or occupancy shall comply with Section 306.7.

Section ID: text-id-27436689-0

Exception: Type B dwelling or sleeping units required by Section 1108 of the International Building Code are not required to be provided in existing buildings and facilities undergoing a change of occupancy in conjunction with alterations where the work area is 50 percent or less of the aggregate area of the building.

Section ID: text-id-27436689-1

Provisions for new construction shall apply to additions. An addition that affects the accessibility to, or contains an area of, a primary function shall comply with the requirements in Section

306.7.1.

Section ID: text-id-27436691-0

A facility that is altered shall comply with the applicable provisions in Chapter 11 of the International Building Code, ICC A117.1 and the provisions of Sections 306.7.1 through 306.7.16, unless technically infeasible. Where compliance with this section is technically infeasible, the alteration shall provide access to the maximum extent technically feasible.

Section ID: text-id-27436693-0

Where an alteration affects the accessibility to, or contains an area of primary function, the route to the primary function area shall be accessible. The accessible route to the primary function area shall include toilet facilities and drinking fountains serving the area of primary function.

Section ID: text-id-27436694-0

Exceptions:

Section ID: text-id-27436694-1

1.The costs of providing the accessible route are not required to exceed 20 percent of the costs of the alterations affecting the area of primary function.

Section ID: text-id-27436694-2

2.This provision does not apply to alterations limited solely to windows, hardware, operating controls, electrical outlets and signs.

Section ID: text-id-27436694-3

3.This provision does not apply to alterations limited solely to mechanical systems, electrical systems, installation or alteration of fire protection systems and abatement of hazardous materials.

Section ID: text-id-27436694-4

4.This provision does not apply to alterations undertaken for the primary purpose of increasing the accessibility of a facility.

Section ID: text-id-27436694-5

5.This provision does not apply to altered areas limited to Type B dwelling and sleeping units.

Section ID: text-id-27436694-6

Accessible means of egress required by Chapter 10 of the International Building Code are not required to be added in existing facilities.

Section ID: text-id-27436696-0

The alteration to Type A individually owned dwelling units within a Group R-2 occupancy shall be permitted to meet the provision for a Type B dwelling unit.

Section ID: text-id-27436698-0

Type B dwelling or sleeping units required by Section 1108 of the International Building Code are not required to be provided in existing buildings and facilities undergoing alterations where the work area is 50 percent or less of the aggregate area of the building.

Section ID: text-id-27436700-0

Where an alteration includes alterations to an entrance that is not accessible, and the facility has an accessible entrance, the altered entrance is not required to be accessible unless required by Section 306.7.1. Signs complying with Section 1112 of the International Building Code shall be provided.

Section ID: text-id-27436702-0

Exterior accessible routes, including curb ramps, shall be not less than 36 inches (914 mm) minimum in width.

Section ID: text-id-27436704-0

Altered elements of existing elevators shall comply with ASME A17.1. Such elements shall also be altered in elevators programmed to respond to the same hall call control as the altered elevator.

Section ID: text-id-27436706-0

Platform (wheelchair) lifts installed in accordance with ASME A18.1 shall be permitted as a component of an accessible route.

Section ID: text-id-27436708-0

Where an escalator or stairway is added where none existed previously and major structural modifications are necessary for installation, an accessible route complying with Section 1104.4 of the International Building Code is required between levels served by such escalator or stairway.

Section ID: text-id-27436710-0

Where Chapter 11 of the International Building Code requires Accessible, Type A or Type B units and where such units are being altered or added, the number of Accessible, Type A and Type B units shall be determined in accordance with Sections 306.7.10.1 through 306.7.10.3.

Section ID: text-id-27436712-0

Where Group I-1, I-2, I-3, R-1, R-2 or R-4 dwelling or sleeping units are being altered or added, the requirements of Section 1108 of the International Building Code for Accessible units apply only to the quantity of spaces being altered or added.

Section ID: text-id-27436713-0

Where more than 20 Group R-2 dwelling or sleeping units are being altered or added, the requirements of Section 1108 of the International Building Code for Type A units apply only to the quantity of the spaces being altered or added.

Section ID: text-id-27436715-0

Where four or more Group I-1, I-2, R-1, R-2, R-3 or R-4 dwelling or sleeping units are being added, the requirements of Section 1108 of the International Building Code for Type B units apply only to the quantity of the spaces being added. Where Group I-1, I-2, R-1, R-2, R-3 or R-4 dwelling or sleeping units are being altered and where the work area is greater than 50 percent of the aggregate area of the building, the requirements of Section 1108 of the International Building Code for Type B units apply only to the quantity of the spaces being altered.

Section ID: text-id-27436717-0

Where it is technically infeasible to alter existing toilet rooms to be accessible, one accessible single-user toilet room or one accessible family or assisted-use toilet room constructed in accordance with Section 1110.2.1 of the International Building Code is permitted. This toilet room

shall be located on the same floor and in the same area as the existing toilet rooms. At the inaccessible toilet rooms, directional signs indicating the location of the nearest such toilet room shall be provided. These directional signs shall include the International Symbol of Accessibility, and sign characters shall meet the visual character requirements in accordance with ICC A117.1.

Section ID: text-id-27436720-0

Where it is technically infeasible to alter existing bathing rooms to be accessible, one accessible single-user bathing room or one accessible family or assisted-use bathing room constructed in accordance with Section 1110.2.1 of the International Building Code is permitted. This accessible bathing room shall be located on the same floor and in the same area as the existing bathing rooms. At the inaccessible bathing rooms, directional signs indicating the location of the nearest such bathing room shall be provided. These directional signs shall include the International Symbol of Accessibility, and sign characters shall meet the visual character requirements in accordance with ICC A117.1.

Section ID: text-id-27436722-0

In assembly and mercantile occupancies, where additional toilet fixtures are added, not fewer than one accessible family or assisted-use toilet room shall be provided where required by Section 1110.2.1 of the International Building Code. In recreational facilities, where additional bathing rooms are being added, not fewer than one family or assisted-use bathing room shall be provided where required by Section 1110.2.1 of the International Building Code.

Section ID: text-id-27436724-0

Where it is technically infeasible to provide accessible dressing, fitting or locker rooms at the same location as similar types of rooms, one accessible room on the same level shall be provided. Where separate-sex facilities are provided, accessible rooms for each sex shall be provided. Separate-sex facilities are not required where only unisex rooms are provided.

Section ID: text-id-27436726-0

Where the structural or operational characteristics of an amusement ride are altered to the extent that the amusement ride’s performance differs from that specified by the manufacturer or the original design, the amusement ride shall comply with requirements for new construction in Section 1111.4.8 of the International Building Code.

Section ID: text-id-27436728-0

Where compliance with the requirements for accessible routes, entrances or toilet rooms would threaten or destroy the historic significance of the historic structure, as determined by the authority having jurisdiction, the alternative requirements of Sections 306.7.16.1 through 306.7.16.5 for that element shall be permitted.

Section ID: text-id-27436730-0

Exceptions:

Section ID: text-id-27436730-1

1.Accessible means of egress required by Chapter 10 of the International Building Code are not required to be provided in historic structures.

Section ID: text-id-27436730-2

2.The altered element or space is not required to be on an accessible route, unless required by Sections 306.7.16.1 or 306.7.16.2.

Section ID: text-id-27436730-3

Not fewer than one exterior accessible route, including curb ramps from a site arrival point to an accessible entrance, shall be provided and shall not be less than 36 inches (914 mm) minimum in width.

Section ID: text-id-27436731-0

An accessible route from an accessible entrance to public spaces on the level of the accessible entrance shall be provided.

Section ID: text-id-27436733-0

Where an entrance cannot be made accessible in accordance with Section 306.7.5, an accessible entrance that is unlocked while the building is occupied shall be provided; or, a locked accessible entrance with a notification system or remote monitoring shall be provided.

Section ID: text-id-27436735-0

Signs complying with Section 1112 of the International Building Code shall be provided at the public entrances and the accessible entrance.

Section ID: text-id-27436735-1

Where toilet rooms are provided, not fewer than one accessible single-user toilet room or one accessible family or assisted-use toilet room complying with Section 1110.2.1 of the International Building Code shall be provided.

Section ID: text-id-27436737-0

Where bathing rooms are provided, not fewer than one accessible single-user bathing room or one accessible family or assisted-use bathing rooms complying with Section 1110.2.1 of the International Building Code shall be provided.

Section ID: text-id-27436739-0

The alteration to Type A individually owned dwelling units within a Group R-2 occupancy shall be permitted to meet the provision for a Type B dwelling unit.

Section ID: text-id-27436741-0

Type B dwelling or sleeping units required by Section 1108 of the International Building Code are not required to be provided in historic buildings.

Section ID: text-id-27436743-0

Where an alteration, addition, change of occupancy or relocation of a building is made to an existing building or structure of a Group R and I-1 occupancy, the existing building shall be provided with smoke alarms in accordance with the International Fire Code or Section R314 of the International Residential Code.

Section ID: text-id-27436749-0

Exception:Work classified as Level 1 Alterations in accordance with Chapter 7.

Section ID: text-id-27436749-1

Where an addition, alteration, change of occupancy or relocation of a building is made to Group I-1, I-2, I-4 and R occupancies and classrooms of Group E occupancies, the existing building shall be provided with carbon monoxide detection in accordance with the International Fire Code or

Section R315 of the International Residential Code.

Section ID: text-id-27436753-0

Exceptions:

Section ID: text-id-27436753-1

1.Work involving the exterior surfaces of buildings, such as the replacement of roofing or siding, the addition or replacement of windows or doors, or the addition of porches or decks.

Section ID: text-id-27436753-2

2.Installation, alteration or repairs of plumbing or mechanical systems, other than fuel-burning appliances.

Section ID: text-id-27436753-3

3.Work classified as Level 1 Alterations in accordance with Chapter 7.

Section ID: text-id-27436753-4

The provisions of Section 309 apply to all alterations, repairs, additions, relocations of structures and changes of occupancy regardless of compliance method.

Section ID: text-id-27436757-0

Where an exterior wall covering or exterior wall envelope is added or replaced, the materials and methods used shall comply with the requirements for new construction in Chapter 14 and Chapter 26 of the International Building Code if the added or replaced exterior wall covering or exterior wall envelope involves two or more contiguous stories and comprises more than 15 percent of the total wall area on any side of the building.

Section ID: text-id-27436759-0

CHAPTER 4 REPAIRS

Section ID: text-id-27436763 | Section Number: 27436763

User Note: User note:About this chapter: Chapter 4 provides requirements for repairs of existing buildings

User note:

Section ID: text-id-27436763-0

About this chapter: Chapter 4 provides requirements for repairs of existing buildings. The provisions define conditions under which repairs may be made using materials and methods like those of the original construction or the extent to which repairs must comply with requirements for new buildings.

Section ID: text-id-27436763-1

Repairs shall comply with the requirements of this chapter. Repairs to historic buildings need only comply with Chapter 12.

Section ID: text-id-27436765-0

Repairs to existing bleachers, grandstands and folding and telescopic seating shall comply with ICC 300.

Section ID: text-id-27436766-0

The work shall not make the building less complying than it was before the repair was undertaken.

Section ID: text-id-27436769-0

In flood hazard areas, repairs that constitute substantial improvement shall require that the building comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

Section ID: text-id-27436771-0

Replacement glazing in hazardous locations shall comply with the safety glazing requirements of the International Building Code or International Residential Code as applicable.

Section ID: text-id-27436775-0

Exception: Glass block walls, louvered windows and jalousies repaired with like materials.

Section ID: text-id-27436775-1

Repairs shall be done in a manner that maintains the level of fire protection provided.

Section ID: text-id-27436779-0

Repairs shall be done in a manner that maintains the level of protection provided for the means of egress.

Section ID: text-id-27436783-0

Structural repairs shall be in compliance with this section and Section 401.2.

Section ID: text-id-27436787-0

Repairs to damaged buildings shall comply with this section.

Section ID: text-id-27436789-0

Unless otherwise required by this section, for damage less than substantial structural damage, the damaged elements shall be permitted to be restored to their predamage condition.

Section ID: text-id-27436790-0

Structural components whose damage was caused by or related to snow load effects shall be repaired, replaced or altered to satisfy the requirements of Section 1608 of the International Building Code.

Section ID: text-id-27436791-0

A building assigned to Seismic Design Category D, E or F that has sustained disproportionate earthquake damage shall be subject to the requirements for buildings with substantial structural damage to vertical elements of the lateral force-resisting system.

Section ID: text-id-27436794-0

A building that has sustained substantial structural damage to the vertical elements of its lateral force-resisting system shall be evaluated in accordance with Section 405.2.3.1, and either repaired in accordance with Section 405.2.3.2 or repaired and retrofitted in accordance with Section 405.2.3.3, depending on the results of the evaluation.

Section ID: text-id-27436796-0

Exceptions:

Section ID: text-id-27436796-1

1. Buildings assigned to Seismic Design Category A, B or C whose substantial structural damage was not caused by earthquake need not be evaluated or retrofitted for load combinations that include earthquake effects.

Section ID: text-id-27436796-2

2. One- and two-family dwellings need not be evaluated or retrofitted for load combinations that include earthquake effects.

Section ID: text-id-27436796-3

The building shall be evaluated by a registered design professional, and the evaluation findings shall be submitted to the code official. The evaluation shall establish whether the damaged building, if repaired to its predamage state, would comply with the provisions of the International Building Code for load combinations that include wind or earthquake effects, except that the seismic forces shall be the reduced seismic forces.

Section ID: text-id-27436797-0

If the evaluation establishes that the building in its predamage condition complies with the provisions of Section 405.2.3.1, then the damaged elements shall be permitted to be restored to their predamage condition.

Section ID: text-id-27436799-0

If the evaluation does not establish that the building in its predamage condition complies with the provisions of Section 405.2.3.1, then the building shall be retrofitted to comply with the provisions

of this section. The wind loads for the repair and retrofit shall be those required by the building code in effect at the time of original construction, unless the damage was caused by wind, in which case the wind loads shall be in accordance with the International Building Code. The seismic loads for this retrofit design shall be those required by the building code in effect at the time of original construction, but not less than the reduced seismic forces.

Section ID: text-id-27436801-0

Gravity load-carrying components that have sustained substantial structural damage shall be rehabilitated to comply with the applicable provisions for dead, live and snow loads in the International Building Code. Undamaged gravity load-carrying components that receive dead, live or snow loads from rehabilitated components shall also be rehabilitated if required to comply with the design loads of the rehabilitation design.

Section ID: text-id-27436804-0

Regardless of the level of damage to vertical elements of the lateral force-resisting system, if substantial structural damage to gravity load-carrying components was caused primarily by wind or seismic effects, then the building shall be evaluated in accordance with Section 405.2.3.1 and, if noncompliant, retrofitted in accordance with Section 405.2.3.3.

Section ID: text-id-27436805-0

Exceptions:

Section ID: text-id-27436805-1

1. Buildings assigned to Seismic Design Category A, B or C whose substantial structural damage was not caused by earthquake need not be evaluated or retrofitted for load combinations that include earthquake effects.

Section ID: text-id-27436805-2

2. One- and two-family dwellings need not be evaluated or retrofitted for load combinations that include earthquake effects.

Section ID: text-id-27436805-3

Where substantial structural damage to any snow load-carrying components is caused by or related to snow load effects, any components required to carry snow loads on roof framing of similar construction shall be repaired, replaced or retrofitted to satisfy the requirements of Section 1608 of the International Building Code.

Section ID: text-id-27436808-0

In flood hazard areas, buildings that have sustained substantial damage shall be brought into compliance with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

Section ID: text-id-27436810-0

Existing electrical wiring and equipment undergoing repair shall be allowed to be repaired or replaced with like material.

Section ID: text-id-27436815-0

Replacement of electrical receptacles shall comply with the applicable requirements of Section 406.4(D) of NFPA 70.

Section ID: text-id-27436816-0

Plug fuses of the Edison-base type shall be used for replacements only where there is no evidence of over fusing or tampering per applicable requirements of Section 240.51(B) of NFPA 70.

Section ID: text-id-27436818-0

For replacement of nongrounding-type receptacles with grounding-type receptacles and for branch circuits that do not have an equipment grounding conductor in the branch circuitry, the grounding conductor of a grounding-type receptacle outlet shall be permitted to be grounded to any accessible point on the grounding electrode system or to any accessible point on the grounding electrode conductor in accordance with Section 250.130(C) of NFPA 70.

Section ID: text-id-27436820-0

Portions of electrical systems being repaired in Group I-2, ambulatory care facilities and outpatient clinics shall comply with NFPA 99 requirements for repairs.

Section ID: text-id-27436822-0

Frames of electric ranges, wall-mounted ovens, counter-mounted cooking units, clothes dryers and outlet or junction boxes that are part of the existing branch circuit for these appliances shall be permitted to be grounded to the grounded circuit conductor in accordance with Section 250.140 of NFPA 70.

Section ID: text-id-27436824-0

Existing mechanical systems undergoing repair shall not make the building less complying than it was before the damaged occurred.

Section ID: text-id-27436829-0

A mechanical draft system shall be permitted to be used with manually fired appliances and fireplaces where such a system complies with all of the following requirements:

Section ID: text-id-27436831-0

1. The mechanical draft device shall be listed and installed in accordance with the manufacturer’s installation instructions.

Section ID: text-id-27436831-1

2. A device shall be installed that produces visible and audible warning upon failure of the mechanical draft device or loss of electrical power at any time that the mechanical draft device is turned on. This device shall be equipped with a battery backup if it receives power from the building wiring.

Section ID: text-id-27436831-2

3. A smoke detector shall be installed in the room with the appliance or fireplace. This device shall be equipped with a battery backup if it receives power from the building wiring.

Section ID: text-id-27436831-3

Plumbing materials and supplies shall not be used for repairs that are prohibited in the International Plumbing Code.

Section ID: text-id-27436835-0

The maximum water consumption flow rates and quantities for all replaced water closets shall be 1.6 gallons (6 L) per flushing cycle.

Section ID: text-id-27436837-0

Exception: Blowout-design water closets [3.5 gallons (13 L) per flushing cycle].

Section ID: text-id-27436837-1

Portions of medical gas systems being repaired in Group I-2, ambulatory care facilities and outpatient clinics shall comply with NFPA 99 requirements for repairs.

Section ID: text-id-27436839-0

CHAPTER 5 PRESCRIPTIVE COMPLIANCE METHOD

Section ID: text-id-27436843 | Section Number: 27436843

User Note: User note:About this chapter: Chapter 5 provides details for the prescriptive compliance metho

User note:

Section ID: text-id-27436843-0

About this chapter: Chapter 5 provides details for the prescriptive compliance method—one of the three main options of compliance available in this code for buildings and structures undergoing alteration, addition or change of occupancy.

Section ID: text-id-27436843-1

The provisions of this chapter shall control the alteration, addition and change of occupancy of existing buildings and structures, including historic buildings and structures as referenced in Section 301.3.1.

Section ID: text-id-27436845-0

Alterations, additions and changes of occupancy to existing buildings and structures shall comply with the provisions of this chapter or with one of the methods provided in Section 301.3.

Section ID: text-id-27436846-0

Where approved by the code official, in buildings where an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 of the International Building Code has been added, and the building is now sprinklered throughout, the required fire-resistance ratings of building elements and materials shall be permitted to meet the requirements of the current building code. The building is required to meet the other applicable requirements of the International Building Code.

Section ID: text-id-27436849-0

Plans, investigation and evaluation reports, and other data shall be submitted indicating which building elements and materials the applicant is requesting the code official to review and approve for determination of applying the current building code fire-resistance ratings. Any special construction features, including fire-resistance-rated assemblies and smoke-resistive assemblies, conditions of occupancy, means of egress conditions, fire code deficiencies, approved modifications or approved alternative materials, design and methods of construction, and equipment applying to the building that impact required fire-resistance ratings shall be identified in the evaluation reports submitted.

Section ID: text-id-27436849-1

In Group I-2 facilities, ambulatory care facilities and outpatient clinics, any altered or added portion of an existing electrical or medical gas systems shall be required to meet installation and equipment requirements in NFPA 99.

Section ID: text-id-27436851-0

Additions to any building or structure shall comply with the requirements of the International Building Code for new construction. Alterations to the existing building or structure shall be made to ensure that the existing building or structure together with the addition are not less complying with the provisions of the International Building Code than the existing building or structure was prior to the addition. An existing building together with its additions shall comply with the height and area provisions of Chapter 5 of the International Building Code.

Section ID: text-id-27436855-0

A building assigned to Seismic Design Category D, E or F that has sustained disproportionate earthquake damage shall be subject to the requirements for buildings with substantial structural damage to vertical elements of the lateral force-resisting system.

Section ID: text-id-27436857-0

For buildings and structures in flood hazard areas established in Section 1612.3 of the International Building Code, or Section R322 of the International Residential Code, as applicable, any addition that constitutes substantial improvement of the existing structure shall comply with the flood design requirements for new construction, and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design.

Section ID: text-id-27436859-0

For buildings and structures in flood hazard areas established in Section 1612.3 of the International Building Code, or Section R322 of the International Residential Code, as applicable, any additions that do not constitute substantial improvement of the existing structure are not required to comply with the flood design requirements for new construction.

Section ID: text-id-27436859-1

Any existing gravity load-carrying structural element for which an addition and its related alterations cause an increase in design dead, live or snow load, including snow drift effects, of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the International Building Code for new structures. Any existing gravity load-carrying structural element whose vertical load-carrying capacity is decreased as part of the addition and its related alterations shall be considered to be an altered element subject to the requirements of Section 503.3. Any existing element that will form part of the lateral load path for any part of the addition shall be considered to be an existing lateral load-carrying structural element subject to the requirements of Section 502.5.

Section ID: text-id-27436861-0

Exception: Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the existing building and the addition together comply with the conventional light-frame construction methods of the International Building Code or the provisions of the International Residential Code.

Section ID: text-id-27436861-1

Where the addition is structurally independent of the existing structure, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the addition is not structurally independent of the existing structure, the existing structure and its addition acting together as a single structure shall be shown to meet the requirements of Sections 1609 and 1613 of the International Building Code using full seismic forces.

Section ID: text-id-27436863-0

Exceptions:

Section ID: text-id-27436863-1

1.Any existing lateral load-carrying structural element whose demand-capacity ratio with the addition considered is not more than 10 percent greater than its demand-capacity ratio with the addition ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the International Building Code. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of additions and alterations since original construction.

Section ID: text-id-27436863-2

2.Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the existing building and the addition together comply with the conventional light-frame construction methods of the International Building Code or the provisions of the International Residential Code.

Section ID: text-id-27436863-3

In Group E occupancies, enhanced classroom acoustics shall be provided in all classrooms in the addition with a volume of 20,000 cubic feet (565 m3) or less. Enhanced classroom acoustics shall comply with the reverberation time in Section 808 of ICC A117.1.

Section ID: text-id-27436865-0

Alterations to any building or structure shall comply with the requirements of the International Building Code for new construction. Alterations shall be such that the existing building or structure is not less complying with the provisions of the International Building Code than the existing building or structure was prior to the alteration.

Section ID: text-id-27436869-0

Exceptions:

Section ID: text-id-27436869-1

1.An existing stairway shall not be required to comply with the requirements of Section 1011 of the International Building Code where the existing space and construction does not allow a reduction in pitch or slope.

Section ID: text-id-27436869-2

2.Handrails otherwise required to comply with Section 1011.11 of the International Building Code shall not be required to comply with the requirements of Section 1014.6 of the International Building Code regarding full extension of the handrails where such extensions would be hazardous because of plan configuration.

Section ID: text-id-27436869-3

3.Where provided in below-grade transportation stations, existing and new escalators shall be permitted to have a clear width of less than 32 inches (815 mm).

Section ID: text-id-27436869-4

For buildings and structures in flood hazard areas established in Section 1612.3 of the International Building Code, or Section R322 of the International Residential Code, as applicable, any alteration that constitutes substantial improvement of the existing structure shall comply with the flood design requirements for new construction, and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design.

Section ID: text-id-27436871-0

For buildings and structures in flood hazard areas established in Section 1612.3 of the International Building Code, or Section R322 of the International Residential Code, as applicable, any alterations that do not constitute substantial improvement of the existing structure are not required to comply with the flood design requirements for new construction.

Section ID: text-id-27436871-1

Any existing gravity load-carrying structural element for which an alteration causes an increase in design dead, live or snow load, including snow drift effects, of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the International Building Code for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the alteration shall be shown to have the capacity to resist the applicable design dead, live and snow loads including snow drift effects required by the International Building Code for new structures.

Section ID: text-id-27436873-0

Exceptions:

Section ID: text-id-27436873-1

1.Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the altered building complies with the conventional light-frame construction methods of the International Building Code or the provisions of the International Residential Code.

Section ID: text-id-27436873-2

2.Buildings in which the increased dead load is due entirely to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m2) or less over an existing single layer of roof covering.

Section ID: text-id-27436873-3

Except as permitted by Section 503.13, where the alteration increases design lateral loads, results in a prohibited structural irregularity as defined in ASCE 7, or decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.

Section ID: text-id-27436875-0

Exceptions:

Section ID: text-id-27436875-1

1.Any existing lateral load-carrying structural element whose demand-capacity ratio with the alteration considered is not more than 10 percent greater than its demand-capacity ratio with the alteration ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design

lateral loads or forces in accordance with Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of additions and alterations since original construction.

Section ID: text-id-27436875-2

2.Buildings in which the increase in the demandcapacity ratio is due entirely to the addition of rooftop-supported mechanical equipment individually having an operating weight less than 400 pounds (181.4 kg) and where the total additional weight of all rooftop equipment placed after initial construction of the building is less than 10 percent of the roof dead load. For purposes of this exception, “roof” shall mean the roof level above a particular story.

Section ID: text-id-27436875-3

Where the work area exceeds 50 percent of the building area, and where the building is assigned to Seismic Design Category F, the structure of the altered building shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.

Section ID: text-id-27436877-0

Where the intended alteration requires a permit for reroofing and involves removal of roofing materials from more than 25 percent of the roof area of a building assigned to Seismic Design Category D, E or F that has parapets constructed of unreinforced masonry, the work shall include installation of parapet bracing to resist out-of-plane seismic forces, unless an evaluation demonstrates compliance of such items. Reduced seismic forces shall be permitted.

Section ID: text-id-27436879-0

Where the work area exceeds 50 percent of the building area, the building is assigned to Seismic Design Category C, D, E or F and the building’s structural system includes concrete or reinforced masonry walls with a flexible roof diaphragm, the alteration work shall include installation of wall anchors at the roof line, unless an evaluation demonstrates compliance of existing wall anchorage. Use of reduced seismic forces shall be permitted.

Section ID: text-id-27436881-0

Where the work area exceeds 50 percent of the building area, the building is assigned to Seismic Design Category C, D, E or F and the building’s structural system includes unreinforced masonry bearing walls, the alteration work shall include installation of wall anchors at the floor and roof lines, unless an evaluation demonstrates compliance of existing wall anchorage. Reduced seismic forces shall be permitted.

Section ID: text-id-27436883-0

Where the work area exceeds 50 percent of the building area, and where the building is assigned to Seismic Design Category C, D, E or F, parapets constructed of unreinforced masonry shall have bracing installed as needed to resist out-of-plane seismic forces, unless an evaluation demonstrates compliance of such items. Reduced seismic forces shall be permitted.

Section ID: text-id-27436885-0

Where the work area exceeds 50 percent of the building area, and where the building is assigned to Seismic Design Category C, D, E or F, unreinforced masonry partitions and nonstructural walls within the work area and adjacent to egress paths from the work area shall be anchored, removed

or altered to resist out-of-plane seismic forces, unless an evaluation demonstrates compliance of such items. Use of reduced seismic forces shall be permitted.

Section ID: text-id-27436887-0

Where the work area exceeds 50 percent of the building area and where work involves a substantial structural alteration, the lateral load-resisting system of the altered building shall satisfy the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.

Section ID: text-id-27436889-0

Exceptions:

Section ID: text-id-27436889-1

1.Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes that are altered based on the conventional light-frame construction methods of the International Building Code or in compliance with the provisions of the International Residential Code.

Section ID: text-id-27436889-2

2.Where the intended alteration involves only the lowest story of a building, only the lateral load-resisting components in and below that story need comply with this section.

Section ID: text-id-27436889-3

Where the intended alteration requires a permit for reroofing and involves removal of roofing materials from more than 50 percent of the roof diaphragm of a building or section of a building located where the ultimate design wind speed is greater than 130 mph (58 m/s) in accordance with Figure 1609.3(1) of the International Building Code, roof diaphragms, connections of the roof diaphragm to roof framing members, and roof-to-wall connections shall be evaluated for the wind loads specified in Section 1609 of the International Building Code, including wind uplift. If the diaphragms and connections in their current condition are not capable of resisting 75 percent of those wind loads, they shall be replaced or strengthened in accordance with the loads specified in Section 1609 of the International Building Code.

Section ID: text-id-27436891-0

Exception: Buildings that have been demonstrated to comply with the wind load provisions in ASCE 7-88 or later editions.

Section ID: text-id-27436891-1

Structural alterations that are intended exclusively to improve the lateral force-resisting system and are not required by other sections of this code shall not be required to meet the requirements of Section 1609 or 1613 of the International Building Code, provided that all of the following apply:

Section ID: text-id-27436893-0

1.The capacity of existing structural systems to resist forces is not reduced.

Section ID: text-id-27436893-1

2.New structural elements are detailed and connected to existing or new structural elements as required by the International Building Code for new construction.

Section ID: text-id-27436893-2

3.New or relocated nonstructural elements are detailed and connected to existing or new structural elements as required by the International Building Code for new construction.

Section ID: text-id-27436893-3

4.The alterations do not create a structural irregularity as defined in ASCE 7 or make an existing structural irregularity more severe.

Section ID: text-id-27436893-4

In Group I-2 occupancies where the alteration is on a story used for sleeping rooms for more than 30 care recipients, the story shall be divided into not less than two compartments by smoke barrier walls in accordance with Section 407.5 of the International Building Code as required for new construction.

Section ID: text-id-27436895-0

Where alterations affect the configuration of an area utilized as a refuge area, the capacity of the refuge area shall not be reduced below the required capacity of the refuge area for horizontal exits in accordance with Section 1026.4 of the International Building Code.

Section ID: text-id-27436897-0

Where the horizontal exit also forms a smoke compartment, the capacity of the refuge area for Group I-1, I-2 and I-3 occupancies and Group B ambulatory care facilities shall not be reduced below that required in Sections 407.5.3, 408.6.2, 420.6.1 and 422.3.2 of the International Building Code, as applicable.

Section ID: text-id-27436897-1

In Group E occupancies, where the work area exceeds 50 percent of the building area, enhanced classroom acoustics shall be provided in all classrooms with a volume of 20,000 cubic feet (565 m3) or less. Enhanced classroom acoustics shall comply with the reverberation time in Section 808 of ICC A117.1.

Section ID: text-id-27436899-0

In Group E occupancies, Group B educational occupancies and Group I-4 occupancies, egress doors with locking arrangements designed to keep intruders from entering the room shall comply with Section 1010.2.8 of the International Building Code.

Section ID: text-id-27436901-0

Where the work area for alterations exceeds 50 percent of the building area and the building has elevator service, a two-way communication systems shall be provided where required by Section 1009.8 of the International Building Code.

Section ID: text-id-27436903-0

Fire escapes shall be permitted only as provided for in Sections 504.1.1 through 504.1.4.

Section ID: text-id-27436907-0

Fire escapes shall not constitute any part of the required means of egress in new buildings.

Section ID: text-id-27436908-0

Existing fire escapes shall continue to be accepted as a component in the means of egress in existing buildings only.

Section ID: text-id-27436910-0

New fire escapes for existing buildings shall be permitted only where exterior stairways cannot be utilized because of lot lines limiting stairway size or because of sidewalks, alleys or roads at grade level. New fire escapes shall not incorporate ladders or access by windows.

Section ID: text-id-27436912-0

Fire escapes shall comply with this section and shall not constitute more than 50 percent of the required number of exits nor more than 50 percent of the required exit capacity.

Section ID: text-id-27436914-0

Where located on the front of the building and where projecting beyond the building line, the lowest landing shall be not less than 7 feet (2134 mm) or more than 12 feet (3658 mm) above grade, and shall be equipped with a counterbalanced stairway to the street. In alleyways and thoroughfares less than 30 feet (9144 mm) wide, the clearance under the lowest landing shall be not less than 12 feet (3658 mm).

Section ID: text-id-27436917-0

The fire escape shall be designed to support a live load of 100 pounds per square foot (4788 Pa) and shall be constructed of steel or other approved noncombustible materials. Fire escapes constructed of wood not less than nominal 2 inches (51 mm) thick are permitted on buildings of Type V construction. Walkways and railings located over or supported by combustible roofs in buildings of Type III and IV construction are permitted to be of wood not less than nominal 2 inches (51 mm) thick.

Section ID: text-id-27436919-0

Stairways shall be not less than 22 inches (559 mm) wide with risers not more than, and treads not less than, 8 inches (203 mm) and landings at the foot of stairways not less than 40 inches (1016 mm) wide by 36 inches (914 mm) long, located not more than 8 inches (203 mm) below the door.

Section ID: text-id-27436921-0

Doors and windows within 10 feet (3048 mm) of fire escape stairways shall be protected with 3/4-hour opening protectives.

Section ID: text-id-27436923-0

Exception: Opening protection shall not be required in buildings equipped throughout with an approved automatic sprinkler system.

Section ID: text-id-27436923-1

The installation or replacement of windows shall be as required for new installations.

Section ID: text-id-27436927-0

In Group R-2 or R-3 buildings containing dwelling units, and one- and two-family dwellings and townhouses regulated by the International Residential Code, window opening control devices or fall prevention devices complying with ASTM F2090 shall be installed where an existing window is replaced and where all of the following apply to the replacement window:

Section ID: text-id-27436929-0

1.The window is operable.

Section ID: text-id-27436929-1

2.One of the following applies:

Section ID: text-id-27436929-2

2.1.The window replacement includes replacement of the sash and frame.

Section ID: text-id-27436929-3

2.2.The window replacement includes the sash only where the existing frame remains.

Section ID: text-id-27436929-4

3.One of the following applies:

Section ID: text-id-27436929-5

3.1.In Group R-2 or R-3 buildings containing dwelling units, the bottom of the clear opening of the window opening is at a height less than 36 inches (915 mm) above the finished floor.

Section ID: text-id-27436929-6

3.2.In one- and two-family dwellings and townhouses regulated by the International Residential Code, the bottom of the clear opening of the window opening is at a height less than 24 inches (610 mm) above the finished floor.

Section ID: text-id-27436929-7

4.The window will permit openings that will allow passage of a 4-inch-diameter (102 mm) sphere when the window is in its largest opened position.

Section ID: text-id-27436929-8

5.The vertical distance from the bottom of the clear opening of the window opening to the finished grade or other surface below, on the exterior of the building, is greater than 72 inches (1829 mm).

Section ID: text-id-27436929-9

Exception: Operable windows where the bottom of the clear opening of the window opening is located more than 75 feet (22 860 mm) above the finished grade or other surface below, on the exterior of the room, space or building, and that are provided with window fall prevention devices that comply with ASTM F2006.

Section ID: text-id-27436929-10

Where windows are required to provide emergency escape and rescue openings in Group R-2 and R-3 occupancies and one- and two-family dwellings and townhouses regulated by the International Residential Code, replacement windows shall be exempt from the requirements of Section 1031.3 of the International Building Code and Section R310.2 of the International Residential Code, provided that the replacement window meets the following conditions:

Section ID: text-id-27436931-0

1.The replacement window is the manufacturer’s largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.

Section ID: text-id-27436931-1

2.Where the replacement of the window is part of a change of occupancy, it shall comply with Section 1011.5.6.

Section ID: text-id-27436931-2

Window opening control devices or fall prevention devices complying with ASTM F2090 shall be permitted for use on windows required to provide emergency escape and rescue openings. After operation to release the control device allowing the window to fully open, the control device shall not reduce the net clear opening area of the window unit. Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys or tools.

Section ID: text-id-27436932-0

Bars, grilles, covers, screens or similar devices are permitted to be placed over emergency escape and rescue openings, bulkhead enclosure or window wells that serve such openings, provided all of the following conditions are met:

Section ID: text-id-27436935-0

1.The minimum net clear opening size complies with the code that was in effect at the time of construction.

Section ID: text-id-27436935-1

2.Such devices shall be releasable or removable from the inside without the use of a key, tool or force greater than that which is required for normal operation of the escape and rescue opening.

Section ID: text-id-27436935-2

3.Where such devices are installed, they shall not reduce the net clear opening of the emergency escape and rescue openings.

Section ID: text-id-27436935-3

4.Smoke alarms shall be installed in accordance with Section 907.2.10 of the International Building Code.

Section ID: text-id-27436935-4

A change of occupancy shall not be made in any building unless that building is made to comply with the requirements of the International Building Code for the use or occupancy. Changes of occupancy in a building or portion thereof shall be such that the existing building is not less complying with the provisions of this code than the existing building or structure was prior to the change. Subject to the approval of the code official, changes of occupancy shall be permitted without complying with all of the requirements of this code for the new occupancy, provided that the new occupancy is less hazardous, based on life and fire risk, than the existing occupancy.

Section ID: text-id-27436939-0

Exception: The building need not be made to comply with Chapter 16 of the International Building Code unless required by Section 506.5.

Section ID: text-id-27436939-1

A change of occupancy with no change of occupancy classification shall not be made to any structure that will subject the structure to any special provisions of the applicable International Codes, without approval of the code official. Compliance shall be only as necessary to meet the specific provisions and is not intended to require the entire building be brought into compliance.

Section ID: text-id-27436940-0

A certificate of occupancy shall be issued where it has been determined that the requirements for the new occupancy classification have been met.

Section ID: text-id-27436943-0

An existing stairway shall not be required to comply with the requirements of Section 1011 of the International Building Code where the existing space and construction does not allow a reduction in pitch or slope.

Section ID: text-id-27436945-0

Where a change of occupancy would require an emergency escape and rescue opening in accordance with Section 1031.1 of the International Building Code, operable windows serving as the emergency escape and rescue opening shall comply with the following

Section ID: text-id-27436947-0

1.An existing operable window shall provide a minimum net clear opening of 4 square feet (0.38 m2) with a minimum net clear opening height of 22 inches (559 mm) and a minimum net clear opening width of 20 inches (508 mm).

Section ID: text-id-27436947-1

2.A replacement window where such window complies with both of the following:

Section ID: text-id-27436947-2

2.1.The replacement window meets the size requirements in Item 1.

Section ID: text-id-27436947-3

2.2.The replacement window is the manufacturer’s largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.

Section ID: text-id-27436947-4

Any building undergoing a change of occupancy shall satisfy the requirements of this section.

Section ID: text-id-27436949-0

Structural elements carrying tributary live loads from an area with a change of occupancy shall satisfy the requirements of Section 1607 of the International Building Code. Design live loads for areas of new occupancy shall be based on Section 1607 of the International Building Code. Design live loads for other areas shall be permitted to use previously approved design live loads.

Section ID: text-id-27436950-0

Exception: Structural elements whose demand-capacity ratio considering the change of occupancy is not more than 5 percent greater than the demand-capacity ratio based on previously approved live loads need not comply with this section.

Section ID: text-id-27436950-1

Where a change of occupancy results in a structure being assigned to a higher risk category, the structure shall satisfy the requirements of Sections 1608 and 1609 of the International Building Code for the new risk category.

Section ID: text-id-27436952-0

Exception: Where the area of the new occupancy is less than 10 percent of the building area, compliance with this section is not required. The cumulative effect of occupancy changes over time shall be considered.

Section ID: text-id-27436952-1

Where a change of occupancy results in a building being assigned to a higher risk category, or where the change is from a Group S or Group U occupancy to any occupancy other than Group S or Group U, the building shall satisfy the requirements of Section 1613 of the International Building Code for the new risk category using full seismic forces.

Section ID: text-id-27436954-0

Exceptions:

Section ID: text-id-27436954-1

1.Where the area of the new occupancy is less than 10 percent of the building area, the occupancy is not changing from a Group S or Group U occupancy, and the new occupancy is not assigned to Risk Category IV, compliance with this section is not required. The cumulative effect of occupancy changes over time shall be considered.

Section ID: text-id-27436954-2

2.Where a change of use results in a building being reclassified from Risk Category I or II to Risk Category III and the seismic coefficient, SDS, is less than 0.33, compliance with this section is not required.

Section ID: text-id-27436954-3

3.Unreinforced masonry bearing wall buildings assigned to Risk Category III and to Seismic Design Category A or B, shall be permitted to use Appendix Chapter A1 of this code.

Section ID: text-id-27436954-4

4.Where the change is from a Group S or Group U occupancy and there is no change of risk category, use of reduced seismic forces shall be permitted.

Section ID: text-id-27436954-5

Any structure that provides operational access to an adjacent structure assigned to Risk Category IV as the result of a change of occupancy shall itself satisfy the requirements of Sections 1608, 1609 and 1613 of the International Building Code. For compliance with Section 1613, International Building Code-level seismic forces shall be used. Where operational access to the Risk Category IV structure is less than 10 feet (3048 mm) from either an interior lot line or from another structure, access protection from potential falling debris shall be provided.

Section ID: text-id-27436956-0

In Group E occupancies, where the work area exceeds 50 percent of the building area, enhanced classroom acoustics shall be provided in all classrooms with a volume of 20,000 cubic feet (565 m3) or less. Enhanced classroom acoustics shall comply with the reverberation time in Section 808 of ICC A117.1.

Section ID: text-id-27436959-0

The provisions of this code that require improvements relative to a building’s existing condition or, in the case of repairs, that require improvements relative to a building’s predamage condition, shall not be mandatory for historic buildings unless specifically required by this section.

Section ID: text-id-27436963-0

The provisions of this code shall apply to historic buildings judged by the code official to constitute a distinct life safety hazard.

Section ID: text-id-27436965-0

Within flood hazard areas established in accordance with Section 1612.3 of the International Building Code, or Section R322 of the International Residential Code, as applicable, where the work proposed constitutes substantial improvement, the building shall be brought into compliance with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

Section ID: text-id-27436967-0

Exception: Historic buildings meeting any of the following criteria need not be brought into compliance:

Section ID: text-id-27436967-1

1.Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places.

Section ID: text-id-27436967-2

2.Determined by the Secretary of the US Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district.

Section ID: text-id-27436967-3

3.Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.

Section ID: text-id-27436967-4

Historic buildings shall comply with the applicable structural provisions in this chapter.

Section ID: text-id-27436969-0

Exceptions:

Section ID: text-id-27436969-1

1.The code official shall be authorized to accept existing floors and existing live loads and to approve operational controls that limit the live load on any floor.

Section ID: text-id-27436969-2

2.Repair of substantial structural damage is not required to comply with Sections 405.2.3, and 405.2.4. Substantial structural damage shall be repaired in accordance with Section 405.2.1.

Section ID: text-id-27436969-3

CHAPTER 6 CLASSIFICATION OF WORK

Section ID: text-id-27436973 | Section Number: 27436973

User Note: User note:About this chapter: Chapter 6 provides an overview of the Work Area Method availa

User note:

Section ID: text-id-27436973-0

About this chapter: Chapter 6 provides an overview of the Work Area Method available as an option for rehabilitation of a building. The chapter defines the different classifications of alterations and provides general requirements for alterations, change of occupancy, additions and historic buildings. Detailed requirements for all of these are given in Chapters 7 through 12.

Section ID: text-id-27436973-1

The provisions of this chapter shall be used in conjunction with Chapters 7 through 12 and shall apply to the alteration, addition and change of occupancy of existing structures, including historic and moved structures, as referenced in Section 301.3.2. The work performed on an existing building shall be classified in accordance with this chapter.

Section ID: text-id-27436975-0

Alterations, additions and changes of occupancy to existing structures shall comply with the provisions of Chapters 7 through 12 or with one of the alternatives provided in Section 301.3.

Section ID: text-id-27436976-0

The work area, as defined in Chapter 2, shall be identified on the construction documents.

Section ID: text-id-27436979-0

Level 1 alterations include the removal and replacement or the covering of existing materials, elements, equipment or fixtures using new materials, elements, equipment or fixtures that serve the same purpose.

Section ID: text-id-27436983-0

Level 1 alterations shall comply with the provisions of Chapter 7.

Section ID: text-id-27436985-0

Level 2 alterations include the addition or elimination of any door or window, the reconfiguration or extension of any system, or the installation of any additional equipment, and shall apply where the work area is equal to or less than 50 percent of the building area.

Section ID: text-id-27436989-0

Exception:The movement or addition of nonfixed and movable fixtures, cases, racks, counters and partitions not over 5 feet 9 inches (1753 mm) in height shall not be considered a Level 2 alteration.

Section ID: text-id-27436989-1

Level 2 alterations shall comply with the provisions of Chapter 7 for Level 1 alterations as well as the provisions of Chapter 8.

Section ID: text-id-27436991-0

Level 3 alterations apply where the work area exceeds 50 percent of the building area.

Section ID: text-id-27436995-0

Level 3 alterations shall comply with the provisions of Chapters 7 and 8 for Level 1 and 2 alterations, respectively, as well as the provisions of Chapter 9.

Section ID: text-id-27436997-0

Change of occupancy provisions apply where the activity is classified as a change of occupancy as defined in Chapter 2.

Section ID: text-id-27437001-0

Changes of occupancy shall comply with the provisions of Chapter 10.

Section ID: text-id-27437003-0

Provisions for additions shall apply where work is classified as an addition as defined in Chapter 2.

Section ID: text-id-27437007-0

Additions to existing buildings shall comply with the provisions of Chapter 11.

Section ID: text-id-27437009-0

Historic building provisions shall apply to buildings classified as historic as defined in Chapter 2.

Section ID: text-id-27437013-0

Except as specifically provided for in Chapter 12, historic buildings shall comply with applicable provisions of this code for the type of work being performed.

Section ID: text-id-27437015-0

CHAPTER 7 ALTERATIONS—LEVEL 1

Section ID: text-id-27437019 | Section Number: 27437019

User Note: User note:About this chapter: Chapter 7 provides the technical requirements for those existing

User note:

Section ID: text-id-27437019-0

About this chapter: Chapter 7 provides the technical requirements for those existing buildings that undergo Level 1 alterations as described in Section 603, which includes replacement or covering of existing materials, elements, equipment or fixtures using new materials for the same purpose. This chapter, similar to other chapters of this code, covers all building-related subjects, such as structural, mechanical, plumbing, electrical and accessibility as well as the fire and life safety issues when the alterations are classified as Level 1. The purpose of this chapter is to provide detailed requirements and provisions to identify the required improvements in the existing building elements, building spaces and building structural system. This chapter is distinguished from Chapters 8 and 9 by involving only replacement of building components with new components. In contrast, Level 2 alterations involve more space reconfiguration, and Level 3 alterations involve more extensive space reconfiguration, exceeding 50 percent of the building area.

Section ID: text-id-27437019-1

Level 1 alterations as described in Section 602 shall comply with the requirements of this chapter. Level 1 alterations to historic buildings shall comply with this chapter, except as modified in Chapter 12.

Section ID: text-id-27437021-0

An existing building or portion thereof shall not be altered such that the building becomes less safe than its existing condition.

Section ID: text-id-27437023-0

Exception: Where the current level of safety or sanitation is proposed to be reduced, the portion altered shall conform to the requirements of the International Building Code.

Section ID: text-id-27437023-1

In flood hazard areas, alterations that constitute substantial improvement shall require that the building comply with Section 1612 of the International Building Code, or Section R322 of the International Residential Code, as applicable.

Section ID: text-id-27437025-0

Newly installed interior wall and ceiling finishes shall comply with Chapter 8 of the International Building Code.

Section ID: text-id-27437029-0

New interior floor finish, including new carpeting used as an interior floor finish material, shall comply with Section 804 of the International Building Code.

Section ID: text-id-27437031-0

Newly installed interior trim materials shall comply with Section 806 of the International Building Code.

Section ID: text-id-27437033-0

In Group R-2 or R-3 buildings containing dwelling units and one- and two-family dwellings and townhouses regulated by the International Residential Code, window opening control devices complying with ASTM F2090 shall be installed where an existing window is replaced and where all of the following apply to the replacement window:

Section ID: text-id-27437035-0

1.The window is operable.

Section ID: text-id-27437035-1

2.One of the following applies:

Section ID: text-id-27437035-2

2.1.The window replacement includes replacement of the sash and frame.

Section ID: text-id-27437035-3

2.2.The window replacement includes the sash only where the existing frame remains.

Section ID: text-id-27437035-4

3.One of the following applies:

Section ID: text-id-27437035-5

3.1.In Group R-2 or R-3 buildings containing dwelling units, the bottom of the clear opening of the window opening is at a height less than 36 inches (915 mm) above the finished floor.

Section ID: text-id-27437035-6

3.2.In one- and two-family dwellings and townhouses regulated by the International Residential Code, the bottom of the clear opening of the window opening is at a height less than 24 inches (610 mm) above the finished floor.

Section ID: text-id-27437035-7

4.The window will permit openings that will allow passage of a 4-inch-diameter (102 mm) sphere when the window is in its largest opened position.

Section ID: text-id-27437035-8

5.The vertical distance from the bottom of the clear opening of the window opening to the finished grade or other surface below, on the exterior of the building, is greater than 72 inches (1829 mm).

Section ID: text-id-27437035-9

Exception:Operable windows where the bottom of the clear opening of the window opening is located more than 75 feet (22 860 mm) above the finished grade or other surface below, on the exterior of the room, space or building, and that are provided with window fall prevention devices that comply with ASTM F2006.

Section ID: text-id-27437035-10

Where windows are required to provide emergency escape and rescue openings in Group R-2 and R-3 occupancies and one- and two-family dwellings and townhouses regulated by the

International Residential Code, replacement windows shall be exempt from the requirements of Section 1031.3 of the International Building Code and Section R310.2 of the International Residential Code, provided that the replacement window meets the following conditions:

Section ID: text-id-27437037-0

1.The replacement window is the manufacturer’s largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.

Section ID: text-id-27437037-1

2.Where the replacement window is part of a change of occupancy it shall comply with Section 1011.5.6.

Section ID: text-id-27437037-2

Window opening control devices or fall prevention devices complying with ASTM F2090 shall be permitted for use on windows required to provide emergency escape and rescue openings. After operation to release the control device allowing the window to fully open, the control device shall not reduce the net clear opening area of the window unit. Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys or tools.

Section ID: text-id-27437038-0

Bars, grilles, covers, screens or similar devices are permitted to be placed over emergency escape and rescue openings, bulkhead enclosure or window wells that serve such openings, provided all of the following conditions are met:

Section ID: text-id-27437041-0

1.The minimum net clear opening size complies with the code that was in effect at the time of construction.

Section ID: text-id-27437041-1

2.Such devices shall be releasable or removable from the inside without the use of a key, tool or force greater than that which is required for normal operation of the escape and rescue opening.

Section ID: text-id-27437041-2

3.Where such devices are installed, they shall not reduce the net clear opening of the emergency escape and rescue openings.

Section ID: text-id-27437041-3

4.Smoke alarms shall be installed in accordance with Section 907.2.11 of the International Building Code.

Section ID: text-id-27437041-4

New work shall comply with the materials and methods requirements in the International Building Code, International Energy Conservation Code, International Mechanical Code and International Plumbing Code, as applicable, that specify material standards, detail of installation and connection, joints, penetrations and continuity of any element, component or system in the building.

Section ID: text-id-27437043-0

The following sections of the International Fuel Gas Code shall constitute the fuel gas materials and methods requirements for Level 1 alterations.

Section ID: text-id-27437044-0

1.Chapter 3, entitled “General Regulations,” except Sections 303.7 and 306.

Section ID: text-id-27437044-1

2.Chapter 4, entitled “Gas Piping Installations,” except Sections 401.8 and 402.3.

Section ID: text-id-27437044-2

2.1.Sections 401.8 and 402.3 shall apply where the work being performed increases the load on the system such that the existing pipe does not meet the size required by code. Existing systems that are modified shall not require resizing as long as the load on the system is not increased and the system length is not increased even if the altered system does not meet code minimums.

Section ID: text-id-27437044-3

3.Chapter 5, entitled “Chimneys and Vents.”

Section ID: text-id-27437044-4

4.Chapter 6, entitled “Specific Appliances.”

Section ID: text-id-27437044-5

Alterations shall be done in a manner that maintains the level of fire protection provided.

Section ID: text-id-27437049-0

Alterations shall be done in a manner that maintains the level of protection provided for the means of egress.

Section ID: text-id-27437053-0

In Group I-2, Condition 1 occupancies, where the corridor is at least 96 inches (2438 mm) wide, projections into the corridor width are permitted in accordance with Section 407.4.3 of the International Building Code.

Section ID: text-id-27437054-0

Addition, alteration or reconfiguration of nonfixed and movable cases, counters and partitions not over 5 feet 9 inches (1753 mm) in height shall maintain the required means of egress path.

Section ID: text-id-27437057-0

In Group E occupancies, Group B educational occupancies and Group I-4 occupancies, egress doors with locking arrangements designed to keep intruders from entering the room shall comply with Section 1010.2.8 of the International Building Code.

Section ID: text-id-27437059-0

Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15 of the International Building Code.

Section ID: text-id-27437063-0

Exceptions:

Section ID: text-id-27437063-1

1.Roof replacement or roof recover of existing lowslope roof coverings shall not be required to meet the minimum design slope requirement of 1/4 unit vertical in 12 units horizontal (2-percent slope) in Section 1507 of the International Building Code for roofs that provide positive roof drainage.

Section ID: text-id-27437063-2

2.Recovering or replacing an existing roof covering shall not be required to meet the requirement for secondary (emergency overflow) drains or scuppers in Section 1502 of the International Building Code for roofs that provide for positive roof drainage. For the purposes of this exception, existing secondary drainage or scupper systems required in accordance with this code shall not be removed unless they are replaced by secondary drains or scuppers designed and installed in accordance with Section 1502 of the International Building Code.

Section ID: text-id-27437063-3

Roof replacement shall include the removal of all existing layers of roof coverings down to the roof deck.

Section ID: text-id-27437065-0

Exception: Where the existing roof assembly includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507 of the International Building Code.

Section ID: text-id-27437065-1

The installation of a new roof covering over an existing roof covering shall be permitted where any of the following conditions occur:

Section ID: text-id-27437066-0

1.The new roof covering is installed in accordance with the roof covering manufacturer’s approved instructions.

Section ID: text-id-27437066-1

2.Complete and separate roofing systems, such as standing-seam metal roof panel systems, that are designed to transmit the roof loads directly to the building’s structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.

Section ID: text-id-27437066-2

3.Metal panel, metal shingle and concrete and clay tile roof coverings shall be permitted to be installed over existing wood shake roofs when applied in accordance with Section 705.3.

Section ID: text-id-27437066-3

4.The application of a new protective roof coating over an existing protective roof coating, a metal roof panel, built-up roof, spray polyurethane foam roofing system, metal roof shingles, mineralsurfaced roll roofing, modified bitumen roofing or thermoset and thermoplastic single-ply roofing shall be permitted without tear off of existing roof coverings.

Section ID: text-id-27437066-4

A roof recover shall not be permitted where any of the following conditions occur:

Section ID: text-id-27437067-0

1.Where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.

Section ID: text-id-27437067-1

2.Where the existing roof covering is slate, clay, cement or asbestos-cement tile.

Section ID: text-id-27437067-2

3.Where the existing roof has two or more applications of any type of roof covering.

Section ID: text-id-27437067-3

Where the application of a new roof covering over wood shingle or shake roofs creates a combustible concealed space, the entire existing surface shall be covered with gypsum board, mineral fiber, glass fiber or other approved materials securely fastened in place.

Section ID: text-id-27437071-0

Existing slate, clay or cement tile shall be permitted for reinstallation, except that damaged, cracked or broken slate or tile shall not be reinstalled. Existing vent flashing, metal edgings, drain outlets, collars and metal counterflashings shall not be reinstalled where rusted, damaged or deteriorated. Existing ballast that is damaged, cracked or broken shall not be reinstalled. Existing aggregate surfacing materials from built-up roofs shall not be reinstalled.

Section ID: text-id-27437073-0

Flashings shall be reconstructed in accordance with approved manufacturer’s installation instructions. Metal flashing to which bituminous materials are to be adhered shall be primed prior to installation.

Section ID: text-id-27437075-0

Where alteration work includes replacement of equipment that is supported by the building or where a reroofing permit is required, the provisions of this section shall apply.

Section ID: text-id-27437079-0

Any existing gravity load-carrying structural element for which an alteration causes an increase in design dead, live or snow load, including snow drift effects, of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the International Building Code for new structures.

Section ID: text-id-27437081-0

Exceptions:

Section ID: text-id-27437081-1

1.Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the altered building complies with the conventional light-frame construction methods of the International Building Code or the provisions of the International Residential Code.

Section ID: text-id-27437081-2

2.Buildings in which the increased dead load is due entirely to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m2) or less over an existing single layer of roof covering.

Section ID: text-id-27437081-3

The requirements of this section shall apply to alteration work requiring reroof permits.

Section ID: text-id-27437083-0

Where a permit is issued for reroofing for more than 25 percent of the roof area of a building assigned to Seismic Design Category D, E or F that has parapets constructed of unreinforced masonry, the work shall include installation of parapet bracing unless an evaluation demonstrates compliance of such items. Reduced seismic forces shall be permitted.

Section ID: text-id-27437084-0

Where roofing materials are removed from more than 50 percent of the roof diaphragm or section of a building located where the ultimate design wind speed, Vult, determined in accordance with Figure 1609.3(1) of the International Building Code, is greater than 130 mph (58 m/s), roof diaphragms, connections of the roof diaphragm to roof framing members, and roof-towall connections shall be evaluated for the wind loads specified in the International Building Code, including wind uplift. If the diaphragms and connections in their current condition are not capable of resisting 75 percent of those wind loads, they shall be replaced or strengthened in accordance with the loads specified in the International Building Code.

Section ID: text-id-27437086-0

Exception: Buildings that have been demonstrated to comply with the wind load provisions in ASCE 7-88 or later editions.

Section ID: text-id-27437086-1

In Group I-2 facilities, ambulatory care facilities and outpatient clinics, any altered portion of an existing electrical systems shall be required to meet installation and equipment requirements in NFPA 99.

Section ID: text-id-27437091-0

Level 1 alterations to existing buildings or structures do not require the entire building or structure to comply with the energy requirements of the International Energy Conservation Code or International Residential Code. The alterations shall conform to the energy requirements of the International Energy Conservation Code or International Residential Code as they relate to new construction only.

Section ID: text-id-27437095-0

CHAPTER 8 ALTERATIONS—LEVEL 2

Section ID: text-id-27437099 | Section Number: 27437099

User Note: User note:About this chapter: Like Chapter 7, the purpose of this chapter is to provide detailed

User note:

Section ID: text-id-27437099-0

About this chapter: Like Chapter 7, the purpose of this chapter is to provide detailed requirements and provisions to identify the required improvements in the existing building elements, building spaces and building structural system when a building is being altered. This chapter is distinguished from Chapters 7 and 9 by involving space reconfiguration that could be up to and including 50 percent of the area of the building. In contrast, Level 1 alterations (Chapter 7) do not involve space reconfiguration, and Level 3 alterations (Chapter 9) involve extensive space reconfiguration that exceeds 50 percent of the building area. Depending on the nature of alteration work, its location within the building, and whether it encompasses one or more tenants, improvements and upgrades could be required for the open floor penetrations, sprinkler system or the installation of additional means of egress such as stairs or fire escapes.

Section ID: text-id-27437099-1

Level 2 alterations as described in Section 603 shall comply with the requirements of this chapter.

Section ID: text-id-27437101-0

Exception: Buildings in which the reconfiguration is exclusively the result of compliance with the accessibility requirements of Section 306.7.1 shall be permitted to comply with Chapter 7.

Section ID: text-id-27437101-1

In addition to the requirements of this chapter, all work shall comply with the requirements of Chapter 7.

Section ID: text-id-27437103-0

Requirements related to work area are not applicable where the Level 2 alterations are limited solely to one or more of the following:

Section ID: text-id-27437105-0

1.Mechanical systems, electrical systems, fire protection systems and abatement of hazardous materials.

Section ID: text-id-27437105-1

2.Windows, hardware, operating controls, electrical outlets and signs.

Section ID: text-id-27437105-2

3.Alterations undertaken for the primary purpose of increasing the accessibility of a facility.

Section ID: text-id-27437105-3

New construction elements, components, systems and spaces shall comply with the requirements of the International Building Code.

Section ID: text-id-27437107-0

Exceptions:

Section ID: text-id-27437107-1

1.Where windows are added they are not required to comply with the light and ventilation requirements of the International Building Code.

Section ID: text-id-27437107-2

2.Newly installed electrical equipment shall comply with the requirements of Section 806.

Section ID: text-id-27437107-3

3.The length of dead-end corridors in newly constructed spaces shall only be required to comply with the provisions of Section 804.7.

Section ID: text-id-27437107-4

4.The minimum ceiling height of the newly created habitable and occupiable spaces and corridors shall be 7 feet (2134 mm).

Section ID: text-id-27437107-5

5.Where provided in below-grade transportation stations, existing and new escalators shall be permitted to have a clear width of less than 32 inches (815 mm).

Section ID: text-id-27437107-6

6.New structural members and connections shall be permitted to comply with alternative design criteria in accordance with Section 302.

Section ID: text-id-27437107-7

The requirements of this section are limited to work areas in which Level 2 alterations are being performed and shall apply beyond the work area where specified.

Section ID: text-id-27437111-0

Existing vertical openings shall comply with the provisions of Sections 802.2.1, 802.2.2 and 802.2.3.

Section ID: text-id-27437113-0

Existing interior vertical openings connecting two or more floors shall be enclosed with approved assemblies having a fire-resistance rating of not less than 1 hour with approved opening protectives.

Section ID: text-id-27437114-0

Exceptions:

Section ID: text-id-27437114-1

1.Where vertical opening enclosure is not required by the International Building Code or the International Fire Code.

Section ID: text-id-27437114-2

2.Interior vertical openings other than stairways may be blocked at the floor and ceiling of the work area by installation of not less than 2 inches (51 mm) of solid wood or equivalent construction.

Section ID: text-id-27437114-3

3.The enclosure shall not be required where:

Section ID: text-id-27437114-4

3.1.Connecting the main floor and mezzanines; or

Section ID: text-id-27437114-5

3.2.All of the following conditions are met:

Section ID: text-id-27437114-6

3.2.1.The communicating area has a low-hazard occupancy or has a moderate-hazard occupancy that is protected throughout by an automatic sprinkler system.

Section ID: text-id-27437114-7

3.2.2.The lowest or next-to-the lowest level is a street floor.

Section ID: text-id-27437114-8

3.2.3.The entire area is open and unobstructed in a manner such that it is reasonable to assume that a fire in any part of the interconnected spaces will be readily obvious to all of the occupants.

Section ID: text-id-27437114-9

3.2.4.Exit capacity is sufficient to provide egress simultaneously for all occupants of all levels by considering all areas to be a single floor area for the determination of required exit capacity.

Section ID: text-id-27437114-10

3.2.5.Each floor level, considered separately, has not less than one-half of its individual required exit capacity provided by an exit or exits leading directly out of that level without having to traverse another communicating floor level or be exposed to the smoke or fire spreading from another communicating floor level.

Section ID: text-id-27437114-11

4.In Group A occupancies, a minimum 30-minute enclosure shall be provided to protect all vertical openings not exceeding three stories.

Section ID: text-id-27437114-12

5.In Group B occupancies, a minimum 30-minute enclosure shall be provided to protect all vertical openings not exceeding three stories. This enclosure, or the enclosure specified in Section 802.2.1, shall not be required in the following locations:

Section ID: text-id-27437114-13

5.1.Buildings not exceeding 3,000 square feet (279 m2) per floor.

Section ID: text-id-27437114-14

5.2.Buildings protected throughout by an approved automatic fire sprinkler system.

Section ID: text-id-27437114-15

6.In Group E occupancies, the enclosure shall not be required for vertical openings not exceeding three stories where the building is protected throughout by an approved automatic fire sprinkler system.

Section ID: text-id-27437114-16

7.In Group F occupancies, the enclosure shall not be required in the following locations:

Section ID: text-id-27437114-17

7.1.Vertical openings not exceeding three stories.

Section ID: text-id-27437114-18

7.2.Special-purpose occupancies where necessary for manufacturing operations and direct access is provided to not fewer than one protected stairway.

Section ID: text-id-27437114-19

7.3.Buildings protected throughout by an approved automatic sprinkler system.

Section ID: text-id-27437114-20

8.In Group H occupancies, the enclosure shall not be required for vertical openings not exceeding three stories where necessary for manufacturing operations and every floor level has direct access to not fewer than two remote enclosed stairways or other approved exits.

Section ID: text-id-27437114-21

9.In Group M occupancies, a minimum 30-minute enclosure shall be provided to protect all vertical openings not exceeding three stories. This enclosure, or the enclosure specified in Section 802.2.1, shall not be required in the following locations:

Section ID: text-id-27437114-22

9.1.Openings connecting only two floor levels.

Section ID: text-id-27437114-23

9.2.Occupancies protected throughout by an approved automatic sprinkler system.

Section ID: text-id-27437114-24

10.In Group R-1 occupancies, the enclosure shall not be required for vertical openings not exceeding three stories in the following locations:

Section ID: text-id-27437114-25

10.1.Buildings protected throughout by an approved automatic sprinkler system.

Section ID: text-id-27437114-26

10.2.Buildings with less than 25 dwelling units or sleeping units where every sleeping room above the second floor is provided with direct access to a fire escape or other approved second exit by means of an approved exterior door or window having a sill height of not greater than 44 inches (1118 mm) and where both of the following conditions are met:

Section ID: text-id-27437114-27

10.2.1.Any exit access corridor exceeding 8 feet (2438 mm) in length that serves two means of egress, one of which is an unprotected vertical opening, shall have not fewer than one of the means of egress separated from the vertical opening by a 1-hour fire barrier.

Section ID: text-id-27437114-28

10.2.2.The building is protected throughout by an automatic fire alarm system, installed and supervised in accordance with the International Building Code.

Section ID: text-id-27437114-29

11.In Group R-2 occupancies, a minimum 30-minute enclosure shall be provided to protect all vertical openings not exceeding three stories. This enclosure, or the enclosure specified in Section 802.2.1, shall not be required in the following locations:

Section ID: text-id-27437114-30

11.1.Vertical openings not exceeding two stories with not more than four dwelling units per floor.

Section ID: text-id-27437114-31

11.2.Buildings protected throughout by an approved automatic sprinkler system.

Section ID: text-id-27437114-32

11.3.Buildings with not more than four dwelling units per floor where every sleeping room above the second floor is provided with direct access to a fire escape or other approved second exit by means of an approved exterior door or window having a sill height of not greater than 44 inches (1118 mm) and the building is protected throughout by an automatic fire alarm system complying with Section 803.4.

Section ID: text-id-27437114-33

12.One- and two-family dwellings.

Section ID: text-id-27437114-34

13.Group S occupancies where connecting not more than two floor levels or where connecting not more than three floor levels and the structure is equipped throughout with an approved automatic sprinkler system.

Section ID: text-id-27437114-35

14.Group S occupancies where vertical opening protection is not required for open parking garages and ramps.

Section ID: text-id-27437114-36

Where the work area on any floor exceeds 50 percent of that floor area, the enclosure requirements of Section 802.2 shall apply to vertical openings other than stairways throughout the floor.

Section ID: text-id-27437116-0

Exception: Vertical openings located in tenant spaces that are entirely outside the work area.

Section ID: text-id-27437116-1

Where the work area on any floor exceeds 50 percent of that floor area, stairways that are part of the means of egress serving the work area shall, at a minimum, be enclosed with smoketight construction on the highest work area floor and all floors below.

Section ID: text-id-27437118-0

Exception: Where stairway enclosure is not required by the International Building Code or the International Fire Code.

Section ID: text-id-27437118-1

In Group I-2 occupancies where the work area is on a story used for sleeping rooms for more than 30 care recipients, the story shall be divided into not less than two compartments by smoke barrier walls in accordance with Section 407.5 of the International Building Code as required for new construction.

Section ID: text-id-27437121-0

The interior finish and trim of walls and ceilings in exits and corridors in any work area shall comply with the requirements of the International Building Code.

Section ID: text-id-27437123-0

Exception: Existing materials that do not comply with the requirements of the International Building Code shall be permitted to be treated with an approved fire-retardant coating in accordance with the manufacturer’s instructions to achieve the required classification. Compliance with this section shall be demonstrated by testing the fireretardant coating on the same material and achieving the required performance. Where the same material is not available, testing on a similar material shall be permitted.

Section ID: text-id-27437123-1

Where the work area on any floor exceeds 50 percent of the floor area, Section 802.4 shall apply to the interior finish and trim in exits and corridors serving the work area throughout the floor.

Section ID: text-id-27437124-0

Exception: Interior finish within tenant spaces that are entirely outside the work area.

Section ID: text-id-27437124-1

The requirements of Sections 802.5.1 and 802.5.2 shall apply in all work areas.

Section ID: text-id-27437127-0

Every portion of a floor, such as a balcony or a loading dock, that is more than 30 inches (762 mm) above the floor or grade below and is not provided with guards, or those in which the existing guards are judged to be in danger of collapsing, shall be provided with guards.

Section ID: text-id-27437128-0

Where there are no guards or where existing guards must be replaced, the guards shall be designed and installed in accordance with the International Building Code.

Section ID: text-id-27437130-0

Where approved by the code official, buildings where an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 of the International Building Code has been added, and the building is now sprinklered throughout, the required fire-resistance ratings of building elements and materials shall be permitted to meet the requirements of the current building code. The building is required to meet the other applicable requirements of the International Building Code.

Section ID: text-id-27437133-0

Plans, investigation and evaluation reports, and other data shall be submitted indicating which building elements and materials the applicant is requesting the code official to review and approve for determination of applying the current building code fire-resistance ratings. Any special

construction features, including fire-resistance-rated assemblies and smoke-resistive assemblies, conditions of occupancy, means-of-egress conditions, fire code deficiencies, approved modifications or approved alternative materials, design and methods of construction, and equipment applying to the building that impact required fire-resistance ratings shall be identified in the evaluation reports submitted.

Section ID: text-id-27437133-1

The requirements of this section shall be limited to work areas in which Level 2 alterations are being performed, and where specified they shall apply throughout the floor on which the work areas are located or otherwise beyond the work area.

Section ID: text-id-27437137-0

Where an approved automatic sprinkler system is installed throughout the story, the required fire-resistance rating for any corridor located on the story shall be permitted to be reduced in accordance with the International Building Code. In order to be considered for a corridor rating reduction, such system shall provide coverage for the stairway landings serving the floor and the intermediate landings immediately below.

Section ID: text-id-27437138-0

Automatic sprinkler systems shall be provided in accordance with the requirements of Sections 803.2.1 through 803.2.6. Installation requirements shall be in accordance with the International Building Code.

Section ID: text-id-27437141-0

In high-rise buildings, work areas that have exits or corridors shared by more than one tenant or that have exits or corridors serving an occupant load greater than 30 shall be provided with automatic sprinkler protection in the entire work area where the work area is located on a floor that has a sufficient sprinkler water supply system from an existing standpipe or a sprinkler riser serving that floor.

Section ID: text-id-27437142-0

Where the work area on any floor exceeds 50 percent of that floor area, Section 803.2.1 shall apply to the entire floor on which the work area is located.

Section ID: text-id-27437143-0

Exception: Occupied tenant spaces that are entirely outside the work area.

Section ID: text-id-27437143-1

In buildings with occupancies in Groups A, B, E, F-1, H, I-1, I-3, I-4, M, R-1, R-2, R-4, S- 1 and S-2, work areas that have exits or corridors shared by more than one tenant or that have exits or corridors serving an occupant load greater than 30 shall be provided with automatic sprinkler protection where both of the following conditions occur:

Section ID: text-id-27437146-0

1.The work area is required to be provided with automatic sprinkler protection in accordance with the International Building Code as applicable to new construction.

Section ID: text-id-27437146-1

2.The work area exceeds 50 percent of the floor area.

Section ID: text-id-27437146-2

Exception: If the building does not have sufficient municipal water supply for design of a fire sprinkler system available to the floor without installation of a new fire pump, work areas shall be protected by an automatic smoke detection system throughout all occupiable spaces other than sleeping units or individual dwelling units that activates the occupant notification system in accordance with Sections 907.4, 907.5 and 907.6 of the International Building Code.

Section ID: text-id-27437146-3

In work areas containing mixed uses, one or more of which requires automatic sprinkler protection in accordance with Section 803.2.2, such protection shall not be required throughout the work area provided that the uses requiring such protection are separated from those not requiring protection by fire-resistance-rated construction having a minimum 2-hour rating for Group H and a minimum 1-hour rating for all other occupancy groups.

Section ID: text-id-27437147-0

In Group I-2 occupancies, an automatic sprinkler system installed in accordance with Section 903.3.1.1 of the International Fire Code shall be provided in the following

Section ID: text-id-27437150-0

1.In Group I-2, Condition 1, throughout the work area.

Section ID: text-id-27437150-1

2.In Group I-2, Condition 2, throughout the work area where the work area is 50 percent or less of the smoke compartment.

Section ID: text-id-27437150-2

3.In Group I-2, Condition 2, throughout the smoke compartment in which the work occurs where the work area exceeds 50 percent of the smoke compartment.

Section ID: text-id-27437150-3

Work located in a windowless story, as determined in accordance with the International Building Code, shall be sprinklered where the work area is required to be sprinklered under the provisions of the International Building Code for newly constructed buildings and the building has a sufficient municipal water supply without installation of a new fire pump.

Section ID: text-id-27437152-0

In buildings and areas listed in Table 903.2.11.6 of the International Building Code, work areas that have exits or corridors shared by more than one tenant or that have exits or corridors serving an occupant load greater than 30 shall be provided with an automatic sprinkler system under the following conditions

Section ID: text-id-27437154-0

1.The work area is required to be provided with an automatic sprinkler system in accordance with the International Building Code applicable to new construction; and

Section ID: text-id-27437154-1

2.The building has sufficient municipal water supply for design of an automatic sprinkler system available to the floor without installation of a new fire pump.

Section ID: text-id-27437154-2

Fire sprinkler systems required by this section shall be supervised by one of the following methods:

Section ID: text-id-27437156-0

1.Approved central station system in accordance with NFPA 72.

Section ID: text-id-27437156-1

2.Approved proprietary system in accordance with NFPA 72.

Section ID: text-id-27437156-2

3.Approved remote station system of the jurisdiction in accordance with NFPA 72.

Section ID: text-id-27437156-3

4.Where approved by the code official, approved local alarm service that will cause the sounding of an alarm in accordance with NFPA 72.

Section ID: text-id-27437156-4

Exception: Supervision is not required for the following:

Section ID: text-id-27437156-5

1.Underground key or hub gate valves in roadway boxes.

Section ID: text-id-27437156-6

2.Halogenated extinguishing systems.

Section ID: text-id-27437156-7

3.Carbon dioxide extinguishing systems.

Section ID: text-id-27437156-8

4.Dry- and wet-chemical extinguishing systems.

Section ID: text-id-27437156-9

5.Automatic sprinkler systems installed in accordance with NFPA 13R where a common supply main is used to supply both domestic and automatic sprinkler systems and a separate shutoff valve for the automatic sprinkler system is not provided.

Section ID: text-id-27437156-10

Where the work area includes exits or corridors shared by more than one tenant and is located more than 50 feet (15 240 mm) above or below the lowest level of fire department access, a standpipe system shall be provided. Standpipes shall have an approved fire department connection with hose connections at each floor level above or below the lowest level of fire department access. Standpipe systems shall be installed in accordance with the International Building Code.

Section ID: text-id-27437159-0

Exceptions:

Section ID: text-id-27437159-1

1.A pump shall not be required provided that the standpipes are capable of accepting delivery by fire department apparatus of not less than 250 gallons per minute (gpm) at 65 pounds per square

inch (psi) (946 L/m at 448 KPa) to the topmost floor in buildings equipped throughout with an automatic sprinkler system or not less than 500 gpm at 65 psi (1892 L/m at 448 KPa) to the topmost floor in all other buildings. Where the standpipe terminates below the topmost floor, the standpipe shall be designed to meet (gpm/psi) (L/m/KPa) requirements of this exception for possible future extension of the standpipe.

Section ID: text-id-27437159-2

2.The interconnection of multiple standpipe risers shall not be required.

Section ID: text-id-27437159-3

An approved fire alarm system shall be installed in accordance with Sections 803.4.1 through 803.4.2. Where automatic sprinkler protection is provided in accordance with Section 803.2 and is connected to the building fire alarm system, automatic heat detection shall not be required.

Section ID: text-id-27437161-0

An approved automatic fire detection system shall be installed in accordance with the provisions of this code and NFPA 72. Devices, combinations of devices, appliances, and equipment shall be approved. The automatic fire detectors shall be smoke detectors, except that an approved alternative type of detector shall be installed in spaces such as boiler rooms, where products of combustion are present during normal operation in sufficient quantity to actuate a smoke detector.

Section ID: text-id-27437161-1

A fire alarm system shall be installed in accordance with Sections 803.4.1.1 through 803.4.1.6. Existing alarm-notification appliances shall be automatically activated throughout the building. Where the building is not equipped with a fire alarm system, alarm-notification appliances within the work area shall be provided and automatically activated.

Section ID: text-id-27437162-0

Exceptions:

Section ID: text-id-27437162-1

1.Occupancies with an existing, previously approved fire alarm system.

Section ID: text-id-27437162-2

2.Where selective notification is permitted, alarm-notification appliances shall be automatically activated in the areas selected.

Section ID: text-id-27437162-3

A fire alarm system shall be installed in work areas of Group E occupancies as required by the International Fire Code for existing Group E occupancies.

Section ID: text-id-27437163-0

An automatic fire alarm system shall be installed in work areas of Group I-1 facilities as required by Chapter 11 of the International Fire Code for existing Group I-1 occupancies.

Section ID: text-id-27437165-0

An automatic fire alarm system shall be installed throughout Group I-2 occupancies as required by Chapter 11 of the International Fire Code.

Section ID: text-id-27437167-0

A fire alarm system shall be installed in work areas of Group I-3 occupancies as required by the International Fire Code.

Section ID: text-id-27437169-0

A fire alarm system shall be installed in Group R-1 occupancies as required by the International Fire Code for existing Group R-1 occupancies.

Section ID: text-id-27437171-0

A fire alarm system shall be installed in work areas of Group R-2 apartment buildings as required by the International Fire Code for existing Group R-2 occupancies.

Section ID: text-id-27437173-0

Where the work area on any floor exceeds 50 percent of that floor area, Section 803.4.1 shall apply throughout the floor.

Section ID: text-id-27437176-0

Exception: Alarm-initiating and notification appliances shall not be required to be installed in tenant spaces outside of the work area.

Section ID: text-id-27437176-1

The requirements of this section shall be limited to work areas that include exits or corridors shared by more than one tenant within the work area in which Level 2 alterations are being performed, and where specified they shall apply throughout the floor on which the work areas are located or otherwise beyond the work area.

Section ID: text-id-27437181-0

The means of egress shall comply with the requirements of this section.

Section ID: text-id-27437183-0

Exceptions:

Section ID: text-id-27437183-1

1.Where the work area and the means of egress serving it complies with NFPA 101.

Section ID: text-id-27437183-2

2.Means of egress complying with the requirements of the building code under which the building was constructed shall be considered to be compliant means of egress if, in the opinion of the code official, they do not constitute a distinct hazard to life.

Section ID: text-id-27437183-3

In Group I-2 occupancies, in areas where corridors are used for movement of care recipients in beds, the clear width of ramps and corridors shall be not less than 48 inches (1219 mm).

Section ID: text-id-27437185-0

The number of exits shall be in accordance with Sections 804.4.1 through 804.4.3.

Section ID: text-id-27437187-0

Every story utilized for human occupancy on which there is a work area that includes exits or corridors shared by more than one tenant within the work area shall be provided with the minimum number of exits based on the occupancy and the occupant load in accordance with the

International Building Code. In addition, the exits shall comply with Sections 804.4.1.1 and 804.4.1.2.

Section ID: text-id-27437188-0

A single exit or access to a single exit shall be permitted from spaces, any story or any occupied roof where one of the following conditions exists:

Section ID: text-id-27437189-0

1.The occupant load, number of dwelling units and exit access travel distance do not exceed the values in Table 804.4.1.1(1) or Table 804.4.1.1(2).

Section ID: text-id-27437189-1

2.In Group R-1 or R-2, buildings without an approved automatic sprinkler system, individual single-story or multiple-story dwelling or sleeping units shall be permitted to have a single exit or access to a single exit from the dwelling or sleeping unit provided one of the following criteria are met:

Section ID: text-id-27437189-2

2.1.The occupant load is not greater than 10 and the exit access travel distance within the unit does not exceed 75 feet (22 860 mm).

Section ID: text-id-27437189-3

2.2.The building is not more than three stories in height; all third-story space is part of dwelling with an exit access doorway on the second story; and the portion of the exit access travel distance from the door to any habitable room within any such unit to the unit entrance doors does not exceed 50 feet (15 240 mm).

Section ID: text-id-27437189-4

3.In buildings of Group R-2 occupancy of any number of stories with not more than four dwelling units per floor served by an interior exit stairway; with a smokeproof enclosure in accordance with Sections 909.20 and 1023.12 of the International Building Code or an exterior stairway as an exit; and where the portion of the exit access travel distance from the dwelling unit entrance door to the exit is not greater than 20 feet (6096 mm).

Section ID: text-id-27437189-5

TABLE 804.4.1.1(1)

Section ID: text-id-27437190-0

STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES

Section ID: text-id-27437190-1

For SI: 1 foot = 304.8 mm.

Section ID: text-id-27437204-0

NP = Not Permitted.

Section ID: text-id-27437204-1

NA = Not Applicable.

Section ID: text-id-27437204-2

a.Group R-2, without an approved automatic sprinkler system and provided with emergency escape and rescue openings in accordance with Section 1031 of the International Building Code.

Section ID: text-id-27437204-3

TABLE 804.4.1.1(2)

Section ID: text-id-27437205-0

STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

Section ID: text-id-27437205-1

For SI: 1 foot = 304.8 mm.

Section ID: text-id-27437223-0

NP = Not Permitted.

Section ID: text-id-27437223-1

NA = Not Applicable.

Section ID: text-id-27437223-2

a.The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

Section ID: text-id-27437223-3

For other than Group I-2, where more than one exit is required, an existing or newly constructed fire escape complying with Section 804.4.1.2.1 shall be accepted as providing one of the required means of egress.

Section ID: text-id-27437225-0

Fire escapes shall comply with all of the following requirements:

Section ID: text-id-27437226-0

1.Occupants shall have unobstructed access to the fire escape without having to pass through a room subject to locking.

Section ID: text-id-27437226-1

2.Access to a new fire escape shall be through a door, except that windows shall be permitted to provide access from single dwelling units or sleeping units in Group R-1, R-2 and I-1 occupancies or to provide access from spaces having a maximum occupant load of 10 in other occupancy classifications.

Section ID: text-id-27437226-2

2.1.The window shall have a minimum net clear opening of 5.7 square feet (0.53 m2) or 5 square feet (0.46 m2) where located at grade.

Section ID: text-id-27437226-3

2.2.The minimum net clear opening height shall be 24 inches (610 mm) and net clear opening width shall be 20 inches (508 mm).

Section ID: text-id-27437226-4

2.3.The bottom of the clear opening shall not be greater than 44 inches (1118 mm) above the floor.

Section ID: text-id-27437226-5

2.4.The operation of the window shall comply with the operational constraints of the International Building Code.

Section ID: text-id-27437226-6

3.Newly constructed fire escapes shall be permitted only where exterior stairways cannot be utilized because of lot lines limiting the stairway size or because of the sidewalks, alleys, or roads at grade level.

Section ID: text-id-27437226-7

4.Openings within 10 feet (3048 mm) of fire escape stairways shall be protected by fire assemblies having minimum 3/4-hour fire-resistance ratings.

Section ID: text-id-27437226-8

Exception: Opening protection shall not be required in buildings equipped throughout with an approved automatic sprinkler system.

Section ID: text-id-27437226-9

5.In all buildings of Group E occupancy, up to and including the 12th grade, buildings of Group I occupancy, rooming houses and childcare centers, ladders of any type are prohibited on fire escapes used as a required means of egress.

Section ID: text-id-27437226-10

The fire escape shall be designed to support a live load of 100 pounds per square foot (4788 Pa) and shall be constructed of steel or other approved noncombustible materials. Fire escapes constructed of wood not less than nominal 2 inches (51 mm) thick are permitted on buildings of Type V construction. Walkways and railings located over or supported by combustible roofs in buildings of Types III and IV construction are permitted to be of wood not less than nominal 2 inches (51 mm) thick.

Section ID: text-id-27437228-0

Stairways shall be not less than 22 inches (559 mm) wide with risers not more than, and treads not less than, 8 inches (203 mm). Landings at the foot of stairways shall be not less than 40 inches (1016 mm) wide by 36 inches (914 mm) long and located not more than 8 inches (203 mm) below the door.

Section ID: text-id-27437230-0

Mezzanines in the work area and with an occupant load of more than 50 or in which the travel distance to an exit exceeds 75 feet (22 860 mm) shall have access to not fewer than two independent means of egress.

Section ID: text-id-27437234-0

Exception: Two independent means of egress are not required where the travel distance to an exit does not exceed 100 feet (30 480 mm) and the building is protected throughout with an automatic sprinkler system.

Section ID: text-id-27437234-1

Buildings of Group A with an occupant load of 300 or more shall be provided with a main entrance capable of serving as the main exit with an egress capacity of not less than one-half of the total occupant load. The remaining exits shall be capable of providing one-half of the total required exit capacity.

Section ID: text-id-27437236-0

Exception: Where a main exit is not well defined or where multiple main exits are provided, exits shall be permitted to be distributed around the perimeter of the building provided that the total width of egress is not less than 100 percent of the required width.

Section ID: text-id-27437236-1

Egress doorways in any work area shall comply with Sections 804.5.1 through 804.5.5.

Section ID: text-id-27437239-0

Work areas shall be provided with two egress doorways in accordance with the requirements of Sections 804.5.1.1 and 804.5.1.2.

Section ID: text-id-27437240-0

In any work area, all rooms and spaces having an occupant load greater than 50 or in which the travel distance to an exit exceeds 75 feet (22 860 mm) shall have not fewer than two egress doorways.

Section ID: text-id-27437241-0

Exceptions:

Section ID: text-id-27437241-1

1.Storage rooms having a maximum occupant load of 10.

Section ID: text-id-27437241-2

2.Where the work area is served by a single exit in accordance with Section 804.4.1.1.

Section ID: text-id-27437241-3

In Group I-2, Condition 2 work areas that include altered care suites shall comply with Sections 407.4.4 through 407.4.4.6.2 of the International Building Code.

Section ID: text-id-27437243-0

In the work area and in the egress path from any work area to the exit discharge, all egress doors serving an occupant load greater than 50 shall swing in the direction of exit travel.

Section ID: text-id-27437246-0

Where the work area exceeds 50 percent of the floor area, door swing shall comply with Section 804.5.2 throughout the floor.

Section ID: text-id-27437247-0

Exception: Means of egress within or serving only a tenant space that is entirely outside the work area.

Section ID: text-id-27437247-1

In any work area, all doors opening onto an exit passageway at grade or an exit stairway shall be self-closing or automatic-closing by listed closing devices.

Section ID: text-id-27437250-0

Exceptions:

Section ID: text-id-27437250-1

1.Where exit enclosure is not required by the International Building Code.

Section ID: text-id-27437250-2

2.Means of egress within or serving only a tenant space that is entirely outside the work area.

Section ID: text-id-27437250-3

Where the work area exceeds 50 percent of the floor area, doors shall comply with Section 804.5.3 throughout the exit stairway from the work area to, and including, the level of exit discharge.

Section ID: text-id-27437251-0

In any work area, and in the egress path from any work area to the exit discharge, in buildings or portions thereof of Group A assembly occupancies with an occupant load greater than 100, all required exit doors equipped with latching devices shall be equipped with approved panic or fire exit hardware in accordance with Section 1010.2.9 of the International Building Code.

Section ID: text-id-27437254-0

Where the work area exceeds 50 percent of the floor area, panic hardware shall comply with Section 804.5.4 throughout the floor.

Section ID: text-id-27437255-0

Exception: Means of egress within a tenant space that is entirely outside the work area.

Section ID: text-id-27437255-1

Power-operated sliding doors or power-operated locks for swinging doors shall be operable by a manual release mechanism at the door. Emergency power shall be provided for the doors and locks in accordance with Section 2702 of the International Building Code.

Section ID: text-id-27437258-0

Exceptions:

Section ID: text-id-27437258-1

1.Emergency power is not required in facilities with 10 or fewer locks complying with the exception to Section 408.4.1 of the International Building Code.

Section ID: text-id-27437258-2

2.Emergency power is not required where remote mechanical operating releases are provided.

Section ID: text-id-27437258-3

Openings in corridor walls in any work area shall comply with Sections 804.6.1 through 804.6.4.

Section ID: text-id-27437261-0

Exception: Openings in corridors where such corridors are not required to be rated in accordance with the International Building Code.

Section ID: text-id-27437261-1

Corridor doors in the work area shall not be constructed of hollow core wood and shall not contain louvers. Dwelling unit or sleeping unit corridor doors in work areas in buildings of Groups R-1, R-2 and I-1 shall be not less than 13/8-inch (35 mm) solid core wood or approved equivalent and shall not have any glass panels, other than approved wired glass or other approved glazing material in metal frames. Dwelling unit or sleeping unit corridor doors in work areas in buildings of Groups R-1, R-2 and I-1 shall be equipped with approved door closers. Replacement doors shall be 13/4-inch (44 mm) solid bonded wood core or approved equivalent, unless the existing frame will accommodate only a 13/8-inch (35 mm) door.

Section ID: text-id-27437262-0

Exceptions:

Section ID: text-id-27437262-1

1.Corridor doors within a dwelling unit or sleeping unit.

Section ID: text-id-27437262-2

2.Existing doors meeting the requirements of Guidelines on Fire Ratings of Archaic Materials and Assemblies (Resource A) for a rating of 15 minutes or more shall be accepted as meeting the provisions of this requirement.

Section ID: text-id-27437262-3

3.Existing doors in buildings protected throughout with an approved automatic sprinkler system shall be required only to resist smoke, be reasonably tight fitting and shall not contain louvers.

Section ID: text-id-27437262-4

4.In group homes with not more than 15 occupants and that are protected with an approved automatic detection system, closing devices are not required.

Section ID: text-id-27437262-5

5.Door assemblies having a fire protection rating of not less than 20 minutes.

Section ID: text-id-27437262-6

In all buildings of Group I-1, I-2, R-1 and R-2 occupancies, all transoms in corridor walls in work areas shall be either glazed with 1/4-inch (6.4 mm) wired glass set in metal frames or other glazing assemblies having a fire protection rating as required for the door and permanently secured in the closed position or sealed with materials consistent with the corridor construction.

Section ID: text-id-27437264-0

In any work area, unless protected in accordance with Section 716 of the International Building Code, any other sash, grille or opening in a corridor, and any window in a corridor not opening to the outside air, shall be sealed with materials consistent with the corridor construction.

Section ID: text-id-27437266-0

Where the work area exceeds 50 percent of the floor area, Section 804.6.3 shall be applicable to all corridor windows, grills, sashes and other openings on the floor.

Section ID: text-id-27437267-0

Exception: Means of egress within or serving only a tenant space that is entirely outside the work area.

Section ID: text-id-27437267-1

Where the work area on any floor exceeds 50 percent of the floor area, the requirements of Sections 804.6.1 through 804.6.3 shall apply throughout the floor.

Section ID: text-id-27437270-0

Dead-end corridors in any work area shall not exceed 35 feet (10 670 mm). In Group I-2 occupancies, dead-end corridors shall not exceed 30 feet (9144 mm).

Section ID: text-id-27437273-0

Exceptions:

Section ID: text-id-27437273-1

1.Where dead-end corridors of greater length are permitted by the International Building Code.

Section ID: text-id-27437273-2

2.In other than Group A, I-2 and H occupancies, the maximum length of an existing dead-end corridor shall be 50 feet (15 240 mm) in buildings equipped throughout with an automatic fire alarm system installed in accordance with the International Building Code.

Section ID: text-id-27437273-3

3.In other than Group A, I-2 and H occupancies, the maximum length of an existing dead-end corridor shall be 70 feet (21 356 mm) in buildings equipped throughout with an automatic sprinkler system installed in accordance with the International Building Code.

Section ID: text-id-27437273-4

4.In other than Group A, I-2 and H occupancies, the maximum length of an existing, newly constructed, or extended dead-end corridor shall not exceed 50 feet (15 240 mm) on floors equipped with an automatic sprinkler system installed in accordance with the International Building Code.

Section ID: text-id-27437273-5

Means-of-egress lighting shall be in accordance with this section, as applicable.

Section ID: text-id-27437275-0

Means of egress in all work areas shall be provided with artificial lighting in accordance with the requirements of the International Building Code.

Section ID: text-id-27437276-0

Where the work area on any floor exceeds 50 percent of that floor area, means of egress throughout the floor shall comply with Section 804.8.1.

Section ID: text-id-27437278-0

Exception: Means of egress within or serving only a tenant space that is entirely outside the work area.

Section ID: text-id-27437278-1

Exit signs shall be in accordance with this section, as applicable.

Section ID: text-id-27437281-0

Means of egress in all work areas shall be provided with exit signs in accordance with the requirements of the International Building Code.

Section ID: text-id-27437282-0

Where the work area on any floor exceeds 50 percent of that floor area, means of egress throughout the floor shall comply with Section 804.9.1.

Section ID: text-id-27437284-0

Exception: Means of egress within a tenant space that is entirely outside the work area.

Section ID: text-id-27437284-1

The requirements of Sections 804.10.1 and 804.10.2 shall apply to handrails from the work area floor to, and including, the level of exit discharge.

Section ID: text-id-27437287-0

Every required exit stairway that is part of the means of egress for any work area and that has three or more risers and is not provided with not fewer than one handrail, or in which the existing handrails are judged to be in danger of collapsing, shall be provided with handrails for the full length of the stairway on not fewer than one side. Exit stairways with a required egress width of more than 66 inches (1676 mm) shall have handrails on both sides.

Section ID: text-id-27437288-0

Handrails required in accordance with Section 804.10.1 shall be designed and installed in accordance with the provisions of the International Building Code.

Section ID: text-id-27437290-0

Where alterations affect the configuration of an area utilized as a refuge area, the capacity of the refuge area shall not be reduced below the required capacity of the refuge area for horizontal exits in accordance with Section 1026.4 of the International Building Code. Where the horizontal exit also forms a smoke compartment, the capacity of the refuge area for Group I-1, I-2 and I-3 occupancies and Group B ambulatory care facilities shall not be reduced below that required in Sections 407.5.3, 408.6.2, 420.6.1 and 422.3.2 of the International Building Code, as applicable.

Section ID: text-id-27437293-0

The requirements of Sections 804.12.1 and 804.12.2 shall apply to guards from the work area floor to, and including, the level of exit discharge but shall be confined to the egress path of any work area.

Section ID: text-id-27437295-0

Every open portion of a stairway, landing, or balcony that is more than 30 inches (762 mm) above the floor or grade below and is not provided with guards, or those portions in which existing guards are judged to be in danger of collapsing, shall be provided with guards.

Section ID: text-id-27437296-0

Guards required in accordance with Section 804.12.1 shall be designed and installed in accordance with the International Building Code.

Section ID: text-id-27437298-0

Structural elements and systems within buildings undergoing Level 2 alterations shall comply with this section.

Section ID: text-id-27437303-0

Any existing gravity load-carrying structural element for which an alteration causes an increase in design dead, live or snow load, including snow drift effects, of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the International Building Code for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the alteration shall be shown to have the capacity to resist the applicable design dead, live and snow loads, including snow drift effects, required by the International Building Code for new structures.

Section ID: text-id-27437305-0

Exceptions:

Section ID: text-id-27437305-1

1.Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the altered building complies with the conventional light-frame construction methods of the International Building Code or the provisions of the International Residential Code.

Section ID: text-id-27437305-2

2.Buildings in which the increased dead load is attributable to the addition of a second layer of roof covering weighing 3 pounds per square foot (0.1437 kN/m2) or less over an existing single layer of roof covering.

Section ID: text-id-27437305-3

Except as permitted by Section 805.4, where the alteration increases design lateral loads, or where the alteration results in prohibited structural irregularity as defined in ASCE 7, or where the alteration decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.

Section ID: text-id-27437307-0

Exception: Any existing lateral load-carrying structural element whose demand-capacity ratio with the alteration considered is not more than 10 percent greater than its demand-capacity ratio with the alteration ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of additions and alterations since original construction.

Section ID: text-id-27437307-1

Structural alterations that are intended exclusively to improve the lateral force-resisting system and are not required by other sections of this code shall not be required to meet the requirements of Section 1609 or Section 1613 of the International Building Code, provided that the following conditions are met:

Section ID: text-id-27437309-0

1.The capacity of existing structural systems to resist forces is not reduced.

Section ID: text-id-27437309-1

2.New structural elements are detailed and connected to existing or new structural elements as required by the International Building Code for new construction.

Section ID: text-id-27437309-2

3.New or relocated nonstructural elements are detailed and connected to existing or new structural elements as required by the International Building Code for new construction.

Section ID: text-id-27437309-3

4.The alterations do not create a structural irregularity as defined in ASCE 7 or make an existing structural irregularity more severe.

Section ID: text-id-27437309-4

Newly installed electrical equipment and wiring relating to work done in any work area shall comply with all applicable requirements of NFPA 70 except as provided for in Section 806.4.

Section ID: text-id-27437313-0

Existing wiring in all work areas in Group A-1, A-2, A-5, H and I occupancies shall be upgraded to meet the materials and methods requirements of Chapter 7.

Section ID: text-id-27437315-0

In Group I-2 facilities, ambulatory care facilities and outpatient clinics, any added portion of an existing electrical system shall be required to meet installation and equipment requirements in NFPA 99.

Section ID: text-id-27437317-0

In Group R-2, R-3 and R-4 occupancies and buildings regulated by the International Residential Code, the requirements of Sections 806.4.1 through 806.4.7 shall be applicable only to work areas located within a dwelling unit.

Section ID: text-id-27437319-0

Enclosed areas, other than closets, kitchens, basements, garages, hallways, laundry areas, utility areas, storage areas and bathrooms shall have not fewer than two duplex receptacle outlets or one duplex receptacle outlet and one ceiling or wall-type lighting outlet.

Section ID: text-id-27437320-0

Kitchen areas shall have not fewer than two duplex receptacle outlets.

Section ID: text-id-27437322-0

Laundry areas shall have not fewer than one duplex receptacle outlet located near the laundry equipment and installed on an independent circuit.

Section ID: text-id-27437324-0

Newly installed receptacle outlets shall be provided with ground fault circuit interruption as required by NFPA 70.

Section ID: text-id-27437326-0

Not fewer than one lighting outlet shall be provided in every bathroom, hallway, stairway, attached garage and detached garage with electric power, and to illuminate outdoor entrances and exits.

Section ID: text-id-27437328-0

Not fewer than one lighting outlet shall be provided in utility rooms and basements where such spaces are used for storage or contain equipment requiring service.

Section ID: text-id-27437330-0

Clearance for electrical service equipment shall be provided in accordance with NFPA 70.

Section ID: text-id-27437332-0

Reconfigured spaces intended for occupancy and spaces converted to habitable or occupiable space in any work area shall be provided with natural or mechanical ventilation in accordance with the International Mechanical Code.

Section ID: text-id-27437337-0

Exception: Existing mechanical ventilation systems shall comply with the requirements of Section 807.2.

Section ID: text-id-27437337-1

In mechanically ventilated spaces, existing mechanical ventilation systems that are altered, reconfigured or extended shall provide not less than 5 cubic feet per minute (cfm) (0.0024 m3/s) per person of outdoor air and not less than 15 cfm (0.0071 m3/s) of ventilation air per person, or not less than the amount of ventilation air determined by the Indoor Air Quality Procedure of ASHRAE 62.1.

Section ID: text-id-27437339-0

Newly introduced devices, equipment or operations that produce airborne particulate matter, odors, fumes, vapor, combustion products, gaseous contaminants, pathogenic and allergenic organisms, and microbial contaminants in such quantities as to affect adversely or impair health or cause discomfort to occupants shall be provided with local exhaust.

Section ID: text-id-27437341-0

In Group I-2 facilities, ambulatory care facilities and outpatient clinics, any added portion of an existing medical gas system shall be required to meet installation and equipment requirements in NFPA 99.

Section ID: text-id-27437345-0

Level 2 alterations to existing buildings or structures are permitted without requiring the entire building or structure to comply with the energy requirements of the International Energy Conservation Code or International Residential Code. The alterations shall conform to the energy requirements of the International Energy Conservation Code or International Residential Code as they relate to new construction only.

Section ID: text-id-27437349-0

CHAPTER 9 ALTERATIONS—LEVEL 3

Section ID: text-id-27437353 | Section Number: 27437353

User Note: User note:About this chapter: Chapter 9 provides the technical requirements for those existing

User note:

Section ID: text-id-27437353-0

About this chapter: Chapter 9 provides the technical requirements for those existing buildings that undergo Level 3 alterations. The purpose of this chapter is to provide detailed requirements and provisions to identify the required improvements in the existing building elements, building spaces and building structural system. This chapter is distinguished from Chapters 7 and 8 by involving alterations that cover 50 percent or more of the aggregate area of the building. In contrast, Level 1 alterations do not involve space reconfiguration, and Level 2 alterations involve extensive space reconfiguration that does not exceed 50 percent of the building area. Depending on the nature of alteration work, its location within the building, and whether it encompasses one or more tenants, improvements and upgrades could be required for the open floor penetrations, sprinkler system or the installation of additional means of egress such as stairs or fire escapes. At times and under certain situations, this chapter also is intended to improve the safety of certain building features beyond the work area and in other parts of the building where no alteration work might be taking place.

Section ID: text-id-27437353-1

Level 3 alterations as described in Section 604 shall comply with the requirements of this chapter.

Section ID: text-id-27437355-0

In addition to the provisions of this chapter, work shall comply with all of the requirements of Chapters 7 and 8. The requirements of Sections 802, 803, 804 and 805 shall apply within all work areas whether or not they include exits and corridors shared by more than one tenant and regardless of the occupant load.

Section ID: text-id-27437357-0

Exception: Buildings in which the reconfiguration of space affecting exits or shared egress access is exclusively the result of compliance with the accessibility requirements of Section 306.7.1 shall not be required to comply with this chapter.

Section ID: text-id-27437357-1

Any building having occupied floors more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access shall comply with the requirements of Sections 902.1.1 and 902.1.2.

Section ID: text-id-27437361-0

Where a floor is served by a recirculating air or exhaust system with a capacity greater than 15,000 cubic feet per minute (701 m3/s), that system shall be equipped with approved smoke and heat detection devices installed in accordance with the International Mechanical Code.

Section ID: text-id-27437362-0

Where there is an elevator or elevators for public use, not fewer than one elevator serving the work area shall comply with this section. Existing elevators with a travel distance of 25 feet (7620 mm) or more above or below the main floor or other level of a building and intended to serve the needs of emergency personnel for fire-fighting or rescue purposes shall be provided with emergency operation in accordance with ASME A17.3. New elevators shall be provided with Phase I emergency recall operation and Phase II emergency in-car operation in accordance with ASME A17.1/CSA B44.1.

Section ID: text-id-27437364-0

Boiler and furnace equipment rooms adjacent to or within Group I-1, I- 2, I-4, R-1, R-2 and R-4 occupancies shall be enclosed by 1-hour fire-resistance-rated construction.

Section ID: text-id-27437367-0

Exceptions:

Section ID: text-id-27437367-1

1. Steam boiler equipment operating at pressures of 15 pounds per square inch gauge (psig) (103.4 kPa) or less is not required to be enclosed.

Section ID: text-id-27437367-2

2. Hot water boilers operating at pressures of 170 psig (1171 kPa) or less are not required to be enclosed.

Section ID: text-id-27437367-3

3. Furnace and boiler equipment with 400,000 British thermal units (Btu) (4.22 × 108 J) per hour input rating or less is not required to be enclosed.

Section ID: text-id-27437367-4

4. Furnace rooms protected with an automatic sprinkler system are not required to be enclosed.

Section ID: text-id-27437367-5

Existing stairways that are part of the means of egress shall be enclosed in accordance with Section 802.2.1 from the highest work area floor to, and including, the level of exit discharge and all floors below.

Section ID: text-id-27437371-0

Fire separation in Group R-3 occupancies shall be in accordance with Section 903.2.1.

Section ID: text-id-27437373-0

Where the work area is in any attached dwelling unit in Group R-3 or any multiple single-family dwelling (townhouse), walls separating the dwelling units that are not continuous from the foundation to the underside of the roof sheathing shall be constructed to provide a continuous fire separation using construction materials consistent with the existing wall or complying with the requirements for new structures. Work shall be performed on the side of the dwelling unit wall that is part of the work area.

Section ID: text-id-27437374-0

Exception: Where alterations or repairs do not result in the removal of wall or ceiling finishes exposing the structure, walls are not required to be continuous through concealed floor spaces.

Section ID: text-id-27437374-1

Interior finish in exits serving the work area shall comply with Section 802.4 between the highest floor on which there is a work area to the floor of exit discharge.

Section ID: text-id-27437377-0

In Group E occupancies, where the work area is a Level 3 alteration, enhanced classroom acoustics shall be provided in all classrooms with a volume of 20,000 cubic feet (565 m3) or less. Enhanced classroom acoustics shall comply with the reverberation time in Section 808 of ICC A117.1.

Section ID: text-id-27437379-0

An automatic sprinkler system shall be provided in a work area where required by Section 803.2 or this section.

Section ID: text-id-27437383-0

An automatic sprinkler system shall be provided in work areas where the high rise building has a sufficient municipal water supply for the design and installation of an automatic sprinkler system at the site.

Section ID: text-id-27437384-0

Rubbish and linen chutes located in the work area shall be provided with automatic sprinkler system protection or an approved automatic fire-extinguishing system where protection of the rubbish and linen chute would be required under the provisions of the International Building Code for new construction.

Section ID: text-id-27437386-0

Work areas shall be provided with an automatic sprinkler system in accordance with the International Building Code where any of the following conditions exist:

Section ID: text-id-27437388-0

1. A Group F-1 occupancy used for the manufacture of upholstered furniture or mattresses exceeds 2,500 square feet (232 m2).

Section ID: text-id-27437388-1

2. A Group M occupancy used for the display and sale of upholstered furniture or mattresses exceeds 5,000 square feet (464 m2).

Section ID: text-id-27437388-2

3. A Group S-1 occupancy used for the storage of upholstered furniture or mattresses exceeds 2,500 square feet (232 m2).

Section ID: text-id-27437388-3

In buildings with occupancies in Groups A, B, E, F-1, H, I-1, I-3, I-4, M, R-1, R-2, R-4, S-1 and S-2 work areas shall be provided with automatic sprinkler protection where all of the following conditions occur:

Section ID: text-id-27437390-0

1. The work area is required to be provided with automatic sprinkler protection in accordance with the International Building Code as applicable to new construction.

Section ID: text-id-27437390-1

2. The building site has sufficient municipal water supply for design and installation of an automatic sprinkler system.

Section ID: text-id-27437390-2

Exception:

Section ID: text-id-27437390-3

If the building site does not have sufficient municipal water supply for design of an automatic sprinkler system, work areas shall be protected by an automatic smoke detection system throughout all occupiable spaces other than sleeping units or individual dwelling units that activates the occupant notification system in accordance with Sections 907.4 , 907.5 and 907.6 of the International Building Code.

Section ID: text-id-27437390-4

In Group I-2 occupancies, an automatic sprinkler system installed in accordance with Section 903.3.1.1 of the International Fire Code shall be provided in the following:

Section ID: text-id-27437392-0

1. In Group I-2, Condition 1, throughout the work area.

Section ID: text-id-27437392-1

2. In Group I-2, Condition 2, throughout the work area where the work area is 50 percent or less of the smoke compartment.

Section ID: text-id-27437392-2

3. In Group I-2, Condition 2, throughout the smoke compartment in which the work occurs where the work area exceeds 50 percent of the smoke compartment.

Section ID: text-id-27437392-3

Work located in a windowless story, as determined in accordance with the International Building Code, shall be sprinklered where the work area is required to be sprinklered under the provisions of the International Building Code for newly constructed buildings and the building site has a sufficient municipal water supply for the design and installation of an automatic sprinkler system.

Section ID: text-id-27437394-0

In buildings and areas listed in Table 903.2.11.6 of the International Building Code, work areas shall be provided with an automatic sprinkler system under the following conditions:

Section ID: text-id-27437396-0

1. The work area is required to be provided with an automatic sprinkler system in accordance with the International Building Code applicable to new construction.

Section ID: text-id-27437396-1

2. The building site has sufficient municipal water supply for design and installation of an automatic sprinkler system.

Section ID: text-id-27437396-2

Fire alarm and detection shall be provided in accordance with Section 907 of the International Building Code as required for new construction.

Section ID: text-id-27437399-0

Where required by the International Building Code, a manual fire alarm system shall be provided throughout the work area. Alarm notification appliances shall be provided on such floors and shall be automatically activated as required by the International Building Code.

Section ID: text-id-27437400-0

Exceptions:

Section ID: text-id-27437400-1

1. Alarm-initiating and notification appliances shall not be required to be installed in tenant spaces outside of the work area.

Section ID: text-id-27437400-2

2. Visual alarm notification appliances are not required, except where an existing alarm system is upgraded or replaced or where a new fire alarm system is installed.

Section ID: text-id-27437400-3

Where required by the International Building Code for new buildings, automatic fire detection systems shall be provided throughout the work area.

Section ID: text-id-27437402-0

The means of egress shall comply with the requirements of Section 804 except as specifically required in Sections 905.2 and 905.3.

Section ID: text-id-27437407-0

Means of egress from the highest work area floor to the floor of exit discharge shall be provided with artificial lighting within the exit enclosure in accordance with the requirements of the International Building Code.

Section ID: text-id-27437409-0

Means of egress from the highest work area floor to the floor of exit discharge shall be provided with exit signs in accordance with the requirements of the International Building Code.

Section ID: text-id-27437411-0

In buildings with elevator service, a two-way communication system shall be provided where required by Section 1009.8 of the International Building Code.

Section ID: text-id-27437413-0

Where buildings are undergoing Level 3 alterations, the provisions of this section shall apply.

Section ID: text-id-27437417-0

Where work involves a substantial structural alteration, the lateral load-resisting system of the altered building shall be shown to satisfy the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.

Section ID: text-id-27437419-0

Exceptions:

Section ID: text-id-27437419-1

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes that are altered based on the conventional light-frame construction

methods of the International Building Code or in compliance with the provisions of the International Residential Code.

Section ID: text-id-27437419-2

2. Where the intended alteration involves only the lowest story of a building, only the lateral load resisting components in and below that story need comply with this section.

Section ID: text-id-27437419-3

Where the building is assigned to Seismic Design Category F, the structure of the altered building shall meet the requirements of Sections 1609 and 1613 of the International Building Code. Reduced seismic forces shall be permitted.

Section ID: text-id-27437421-0

For any building assigned to Seismic Design Category D, E or F with a structural system that includes concrete or reinforced masonry walls with a flexible roof diaphragm, the alteration work shall include installation of wall anchors at the roof line of all subject buildings and at the floor lines of unreinforced masonry buildings unless an evaluation demonstrates compliance of existing wall anchorage. Reduced seismic forces shall be permitted.

Section ID: text-id-27437423-0

For any building assigned to Seismic Design Category C, D, E or F with a structural system that includes unreinforced masonry bearing walls, the alteration work shall include installation of wall anchors at the roof line, unless an evaluation demonstrates compliance of existing wall anchorage. Reduced seismic forces shall be permitted.

Section ID: text-id-27437425-0

Parapets constructed of unreinforced masonry in buildings assigned to Seismic Design Category C, D, E or F shall have bracing installed as needed to resist the reduced International Building Code-level seismic forces in accordance with Section 304.3, unless an evaluation demonstrates compliance of such items. Use of reduced seismic forces shall be permitted.

Section ID: text-id-27437427-0

Where the building is assigned to Seismic Design Category C, D, E or F, unreinforced masonry partitions and nonstructural walls within the work area and adjacent to egress paths from the work area shall be anchored, removed, or altered to resist out-of-plane seismic forces, unless an evaluation demonstrates compliance of such items. Use of reduced seismic forces shall be permitted.

Section ID: text-id-27437429-0

Level 3 alterations to existing buildings or structures are permitted without requiring the entire building or structure to comply with the energy requirements of the International Energy Conservation Code or International Residential Code. The alterations shall conform to the energy requirements of the International Energy Conservation Code or International Residential Code as they relate to new construction only.

Section ID: text-id-27437433-0